CORRECTIVE ACTION PLAN

for

Underground Storage Tank Release Site

FORMER HIGHLAND TIRE AND SERVICE STATION
SMOG Centro Vehicle Test Facility
404 Highland Avenue
National City, California
DEH File #H18010-002

November 9, 2005

PREPARED FOR:

Mrs. Helen Abbott
Abbott Family Trust
2537 E. 16th Street
National City, California 91950

PREPARED BY:

COMPLIANCE MONITORING SERVICES
2338 Frankfort Street
San Diego, CA 92110
(619) 276-5470

D. Clinton Williams, PG, CEG

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION AND BACKGROUND

Compliance Monitoring Services (CMS) presents this Corrective Action Plan (CAP) as requested by the County of San Diego Department of Environmental Health (DEH) in previous letters to Mrs. Helen Abbott and Mr./Mrs. Cuong and Lemai Ngo. This CAP is presented in sections that are intended to:

- Summarize the relevant investigations, environmental setting, site observations, and conclusions from the *Site Assessment Report* (CMS, October 27, 2003) and letter *Results of Continued Site Investigation* (CMS, July 14, 2004), *Groundwater Monitoring Update Report* (CMS, May 10, 2005), and the June 2005 groundwater monitoring event.

- Propose appropriate cleanup levels and develop/evaluate at least two site mitigation alternatives for technical feasibility, cost, and potential for meeting the cleanup levels.

- Select and justify a site mitigation alternative and site management strategy that are sufficiently protective of human health and the environment.

1.1 Site Description and Adjacent Lots

The subject petroleum release site, formerly known as Highland Tire and Service (DEH Case #H18010-002), is currently operated as Smog Centro, a test only vehicle inspection station. The site is located between Interstate 5 and the 805 Freeway, at the intersection of 4th Street and Highland Avenue, in National City, California (see Figure 1). The property is a 4,500-square-foot lot, bounded on the south by a grocery market, on the west by a driveway and single family residence, and to the north and east by the city sidewalks and streets (see Figure 2). Future use of the subject site is anticipated as commercial.

The property was owned and operated as a retail gas and service station during the 1970s – 1990s by Mr. Otis Abbott, Mrs. Helen Abbott's deceased husband. A gasoline release was discovered when the underground storage tanks were removed in May 2000, just prior to sale of the property to Cuong & Lemai Ngo Family Trust. The original structure, a metal frame/panel and glass building with partitions for the service garage, office and restroom, remains in the center of the property (see Figure 2). The garage and office doors face Highland Avenue and are typically open during business. The canopy structure provides shade over the former pump islands, and there is an air-operated vehicle hoist on the southwest side of the garage. The ground surface surrounding the building is comprised of asphalt-concrete pavement, and there is a fence along the property boundary to secure the perimeter during non-business hours.

1.2 UST Removal

According to a review of DEH's UST System Closure Report, a total of eight USTs and associated piping were removed on May 31, 2000. The USTs are reported to have contained gasoline and waste

oil. The USTs were observed to be corroded at the time of removal, but free of obvious holes. Hydrocarbon odors and stains were noted, and soil samples were collected at the direction of the DEH Environmental Health Specialist, eight beneath the USTs and three samples beneath the pipelines (see Figure 2). The UST pits and pipeline trenches were subsequently backfilled to grade and resurfaced with asphalt concrete. The DEH's determination of the site's status was deferred pending the results of soil sampling conducted that day.

The soil samples were analyzed one for Total Recoverable Petroleum Hydrocarbons by EPA Method 418.1 (TRPH), 10 for Total Petroleum Hydrocarbons by EPA Method 8015 (TPH), and one for volatile aromatic hydrocarbons (BTEX) and MTBE by Modified EPA Method 8020. The laboratory analytical results for these soil samples collected beneath the USTs and pipelines are summarized on Table 1. The sample analyzed for TRPH and all other samples but one were below detection limit of 10 milligrams per kilogram (mg/kg) for gasoline (TPHg) and diesel fuel (TPHd), and also below method detection limits for BTEX and MTBE. The exception was sample T6-17, which exhibited 23,000 mg/kg TPHg in addition to certain BTEX constituents and <5.0 mg/kg MTBE. This sample was collected near the northern end of Tank #1.

1.4 Site Identification and Workplans

On April 5, 2001, the DEH determined that the Responsible Party should "initiate corrective action" and established case file #H18010-002. There was a general conclusion that gasoline had leaked beneath Tank #1 to the underlying soil, and further investigation would be prudent. On the behalf of the responsible parties, CMS submitted a workplan to DEH and drilled a soil boring, B-1. The resulting *Report of Findings* (CMS; June 26, 2001) confirmed subsurface soil contamination to at least 51 feet deep. In response to DEH's letter request of July 18, 2001, CMS proposed a Soil and Groundwater Investigation (SGI) in *Updated Site Assessment Workplan* (CMS; October 11, 2001). CMS performed the update work by drilling to groundwater and constructing monitoring wells in three locations to characterize subsurface gasoline contamination in the tank pit and downgradient areas. The results of the drilling in 2003 were used to prepare *Site Assessment Report* (CMS; October 27, 2003), and subsequently *Workplan for Continued Site Assessment* (CMS; Feb 2, 2004), *Recommendation for Groundwater Monitoring* (CMS; August 17, 2004) and *Groundwater Monitoring Update Report* (CMS; May 10, 2005).

1.5 Surrounding Land Use

Most recently CMS found the parcels surrounding SMOG Centro facility to be mostly commercial shops on Highland Avenue and single/multi-family residences on the side streets. Future use of the adjacent lots and surrounding area is anticipated as mixed commercial and residential. Adjacent lot usage at the time of this investigation is shown on Figure 3.

2.0 SITE ASSESSMENT ACTIVITIES

The sequential stages of CMS' activities (i.e., soil confirmation sampling, soil and groundwater investigation, soil-vapor/sensitive receptor surveys and groundwater monitoring activities) were carried out according to the respective workplans that were reviewed and approved by DEH prior to implementation. Tables 1 through 3 summarize analytical results for soil, groundwater and soil-vapor samples, and Table 2 also provides the record of groundwater measurements collected during the staged investigation of the Smog Centro site. A description of the actual events follows.

2.1 Soil Confirmation Sampling

Soil analyses during the tank removal activities identified only one zone of hydrocarbon-impacted soil beneath the former Tank #1 location (see sample T6-17' on Figure 2). On the behalf of Mrs. Abbott, CMS proposed to drill one soil boring in the suspected release area with the objective of collecting enough data to: 1) confirm the initial gasoline result, 2) characterize the underlying soil types and possible groundwater occurrence, and 3) assess the vertical extent of gasoline contamination. In May 2001, CMS supervised the drilling of boring SB-1 to a total depth of 50 feet, collected representative soil samples, and recorded geologic conditions and other observations on the Log of Boring B-1. Soil samples from B-1 confirmed the suspected gasoline impact to at least 35 feet below ground surface at the northern end of former Tank #1, and also trace concentrations of TPHg and BTEX in the deeper samples to 50 feet below ground surface (see Table 1 and Figure 2).

2.2 Soil and Groundwater Investigation

Beginning in May 2003, CMS supervised drilling operations to further assess the subsurface impact in the areas surrounding Tank #1. Three additional soil borings were drilled to approximately 10 feet below first groundwater to collect soil samples and to construct groundwater monitoring wells in the locations shown on Figure 2. The MW-3 boring was made on the subject property just east of the UST area and boring B-1, while MW-2 and MW-4 were drilled near the northwestern and southwester property limits, respectively, in the presumed downgradient direction(s).

Soil samples were generally collected on 5-foot depth intervals for visual logging, field screening and potential laboratory testing, though more frequent sampling was accomplished to identify the uppermost water-bearing zone. The borings were used to construct 2-inch diameter wells for groundwater monitoring. CMS made and surveyed the top-of-casing mark on each well to a relative elevation, and the wells were surged and purged to complete the development process.

General information and operating procedures deployed at the site are described in Appendix A. Details of soil boring/sampling and well development are provided in *Site Assessment Report*. Table 1 includes the summary analytical results for soil samples collected during the drilling investigation in May 2003, and Table 2 summarizes the field and laboratory data collected from the wells since they were constructed. CMS' previously interpreted stratigraphic conditions and the extent of TPH impacted soil in *Site Assessment Report*, as provided on Figures 3 and 4.

2.3 Soil-Vapor Survey

To assess potential gasoline vapor concentrations (i.e., benzene), CMS proposed to collect and analyze at least eight representative soil-vapor samples from the approximate depth of 5 feet below ground surface. The human health risk evaluation for the property is based upon modeling of the highest resulting concentration of benzene by EPA Method 8260B and other site-specific parameters using DEH's Vapor Risk Model (2004) to conservatively estimate the level of health risk to typical occupants of the overlying structures.

On May 7, 2004, CMS and H&P Mobile Geochemistry conducted a soil-vapor survey to directly measure subsurface benzene vapors near the building and lot perimeter at the SMOG Centro site. Figure 5 shows the site layout with direct-push probe locations, SV1 through SV9, which were used to collect the soil-vapor samples. The probe locations were first assessed for potential underground utilities by CMS and then by Underground Service Alert using utility records. H&P used a roto-hammer to pierce the ground surface and drive the sampling probes to the target depth of 5 feet below ground surface in each location. The probes were fitted with a retractable tip, narrow-diameter high-density polyethylene tubing and syringe-type pump that allows for purging the tubing and transferring the sample to the mobile laboratory.

The resulting nine soil-vapor samples and one field duplicate sample were analyzed shortly after collection for benzene, toluene, ethylbenzene, xylenes and MTBE (by EPA Method 8260) in H&P's onsite mobile laboratory. As shown on Table 3, the results for benzene and MTBE were below the method detection limit of (1 micrograms per liter [ug/L]) in each of the samples. TPH and other VOCs were also below the respective method detection limits in each of the samples. H&P's laboratory report with the chain-of-custody record and standard operating procedures are provided in *Results of Continued Site Investigation* (CMS, July 14, 2004).

2.4 Groundwater Monitoring

On roughly a quarterly basis since constructing the wells, CMS made depth measurements to establish the localized gradient and flow direction and also sampled the wells for gasoline-range petroleum hydrocarbons. CMS repeated the groundwater monitoring event at the Smog Centro site in June 2005 to enhance the groundwater data set reported in *Groundwater Monitoring Report* (CMS, 2005). The field logs which include specific details of the June 7 activities and the associated laboratory report are presented as Appendix B. The groundwater elevation data collected in June 2005 were used to prepare Figure 6, which presents the recent groundwater elevation contours and calculated flow direction/gradient (south at 0.0003 ft/ft). The summary data on Table 3 indicate the relative concentration and variation in the groundwater analytical results over time. The repeat sampling for VOCs (BTEX and MTBE) shown on Figure 6 generally demonstrates stable concentrations of the target analytes in the three wells since March 2004. Also shown on Figure 6 is the range in the calculated flow direction from west to south at a gradient of less than 0.001 feet/foot.

Purged groundwater from the June 2005 sampling event was stored on site in a labeled polyethylene tank pending disposal arrangements. The groundwater was then discharged to the sanitary sewer on August 30 according to authorization issued by City of San Diego Metropolitan Wastewater Dept.

The Batch Discharge Authorization is provided in Appendix B.

3.0 ENVIRONMENTAL SETTING

CMS researched public maps and reports and used data and observations from the above-described site investigations to characterize the potential for subsurface migration of the gasoline contaminants. The components of the hydrogeologic setting considered during this assessment are as follows:

3.1 Topography

According to a 7.5-minute Quadrangle Map with a 20-foot contour interval, the ground surface at the site is approximately +75 feet (mean sea level datum). The land surface on the property and in the nearby area shows a gentle down slope to the west-southwest. CMS' survey found the topographic high in the northeast corner of the property, and there is a total elevation drop of less than 2 feet across the site at the western property limit. Topographic expression is often a good indicator of the underlying groundwater gradient and flow patterns.

3.2 Geology

According to map entitled "Geology of National City, Imperial Beach, and Otay Mesa Quadrangles, Southern San Diego Metropolitan Area, California," Map Sheet 29, published by California Division of Mines and Geology (Kennedy and Tan, 1977), the site area is underlain by the Bay Point Formation, a poorly consolidated, fine-and medium-grained, pale brown sandstone. Bedding within the Bay Point Formation is shown to dip shallowly southwest in the site vicinity, and the nearest fault is a segment of the La Nacion Fault Zone, which is mapped approximately 2 miles east of the site. The soil types and other geologic conditions observed by CMS were recorded on the soil boring logs presented in *Site Assessment Report* (CMS, 2003).

The geologic profile can be subdivided into the vadose (unsaturated) zone, the capillary zone, and the saturated zone (below groundwater) to predict the typical migration pathways for fuel hydrocarbons. Released fuels in the vadose zone predominantly travel downward until encountering the capillary zone. The capillary zone contains increased moisture at the base of the vadose zone and the uppermost portion of the saturated zone, where the groundwater interface has fluctuated and the gasoline has migrated laterally over time. Vertical migration of liquid petroleum hydrocarbons in the saturated zone is restricted by physical and chemical factors.

Soil samples during drilling beneath the site indicate the vadose zone is predominantly very dense, unsaturated Bay Point Formation, with Fill soil in the former tank pit areas (Figure 3 and 4). The Bay Point Formation within the upper 30 feet bgs consists of two, relatively-thick sand beds separated by a 5- to 7-foot-thick silt layer. Just below the ground surface there also is a zone of imported and native Fill in the former tank pit area to 10.5 feet bgs. Very hard, cohesive soil horizons (i.e. silt and clay) were found in each boring location from 30 feet to greater than 65 feet bgs, except where these beds contain minor sand lenses (<3-feet thick). These "sand stringers" are probably minor because they could not be correlated between the boreholes.

Water-saturated soils were first encountered at 66 feet bgs, where borings MW-2 and MW-3

encountered very dense, well-graded sand. The capillary zone is roughly a 3- to 5-foot thick horizon near the interface of the silt and underlying sand, where the static groundwater level was measured at about 67 feet below ground surface. Soil samples from the saturated zone exhibited free-flowing water at the time of drilling. MW-2 and MW-3 encountered a sequence of sand beds below 66 feet to at least 78 feet bgs. The same zone at MW-4 was notably finer grained (silt), with a heaving sand bed near 80 feet bgs.

3.3 Groundwater

The State of California Regional Water Quality Control Board – San Diego Region publishes the Basin Plan that defines the various hydrologic units and water quality objectives for the (RWQCB, 1994). According to the San Diego Basin Plan, the site lies within the National City Hydrologic Area (HA 8.30) of the Pueblo San Diego Hydrologic Unit. Groundwater in HA 8.30 is designated for existing beneficial use as a municipal water supply. It should be noted that site and surrounding mesa area are within the service area footprint of San Diego County Water Authority; therefore, potable water is generally available to the public at the tap. Groundwater is produced locally by the Sweetwater Authority via the National City Wells, a series of three wells that are screened at various depths greater than 360 feet below ground surface.

CMS' investigation and subsequent monitoring events confirm groundwater at approximately 67 feet below ground surface at the Smog Centro site. Table 2 shows the depths to groundwater and relative groundwater elevation as measured from the top-of-casing mark at each of the three wells over time. Groundwater elevation changes between wells were repeatedly observed to vary by no more than the tolerance of the survey (i.e. +/- 0.01 feet). CMS' analysis of these data shows a very shallow gradient (up to 0.0002 feet/foot) with a flow direction ranging from south to west (see Figure 6). Groundwater velocity beneath the site is expected to be relatively slow due to the slight gradient.

See section 5.4 for further discussion of site groundwater conditions.

3.4 Surface Water

Surface water in HA 8.30 is designated with existing beneficial use for non-contact recreation, wildlife habitat, and rare, threatened, or endangered species habitat, but it is not used for municipal "drinking water" supply (RWQCB, 1994). Surface water normally does not occur on the site or within a 1000-foot radius. Precipitation and surface-water runoff on the site is generally directed west toward a sewer connection or north onto 4th Street, where street gutters drain through the stormdrain to the San Diego Bay. The nearest surface water body is Paradise Creek, and ephemeral stream channel that passes within 2100 feet south of the site. San Diego Bay is located approximately one and one-quarter miles west of the site.

4.0 ASSESSMENT OF SUBSURFACE IMPACT

The relevant findings of CMS' soil and groundwater sampling results and tank removal observations by others are the available information for assessing the residual subsurface impact from past fuel releases at the Smog Centro site. Concentrations of TPH-g and BTEX were detected in representative soil and groundwater samples by EPA Methods 8015 and 8021/8260. The initial investigation confirmed the release of gasoline (with traces of MTBE, and without diesel fuel and other modern oxygenates) beneath the former UST #1. The soil maximum concentrations found during CMS' investigations were 36,000 mg/kg TPHg, 43 mg/kg benzene, and 31 mg/kg MTBE using EPA Method 8260 (as listed for sample B-1@15' on Table 1). Table 1 also shows the maximum soil sample results for toluene, ethylbenzene, and total xylenes, as well as the lesser concentrations of these target analytes. Other modern oxygenates DIPE, TAME, ETBE, and TBA were below detection in those samples tested except 0.32 mg/kg TBA found in boring MW-3 at 16 feet deep. Though MTBE was perhaps indicated in certain soil samples, only once, during the first groundwater monitoring event, was it found in association with levels of TPH-g and BTEX in the groundwater samples (see well MW-3 on Table 2).

Figures 3 and 4 show the respective cross-section and plan view of the UST source and estimated extent of impact with TPH-g in soils of the vadose zone. Though there is indication of a localized groundwater impact, no contaminants were detected in soil samples from the capillary or saturated zones. Figure 6 shows the estimated extent of dissolved-phase benzene based on groundwater samples collected during the seven sampling events between June 2003 and June 2005. These residual impacts to the subsurface, as well as the potential issues of free product and soil vapor, are described in further detail below.

4.1 Near-Surface Soils

Near-surface soils are typically encountered during the construction of building foundations or underground utilities. The ground surface at present is entirely paved with concrete and asphalt, thus there is little known about the condition of the underlying ground surface. Soil impacted with gasoline or diesel fuel was not identified in near-surface soils beneath the product pipelines or the former dispenser island during the tank removal activities in 2000. Because the soil samples collected at 5-feet during drilling did not appear to exhibit TPH, it is not likely there is significantly-impacted soil in the upper 10 feet bgs, especially away from the former Tank #1 location.

4.2 Vadose Zone Soils

Soil samples collected during the UST Closure detected fuel hydrocarbons in only one sample, the T6-17' showed 23,000 mg/kg TPHg in formational soil beneath the northern end of Tank #1. As interpreted from B-1 and MW-3 data, the gasoline impact to soil is limited to the vadose (unsaturated) zone beneath the former tank pit area. There appears to be a relatively narrow horizontal profile of soil impacted with the highest TPH concentrations from 10 to 35 feet bgs. Below that, the outer margin of contamination can be extrapolated to a wider area by projecting the soil results from boring MW-4, which indicated trace concentrations of TPHg at the 40 and 45-foot depths (both 2 mg/kg).

Figure 3 is a plan view of the estimated extent of TPH-impacted soil, and Figure 4 is a cross-sectional interpretation of the soil conditions and extent of TPH-impacted soil. Assuming the released gasoline spread in soil beneath the former Tank #1 from 10 feet and 61 feet bgs, and the horizontal area of the contaminated zone varies with depth due to changes in soil type (as represented in Figure 4), as many as 3,000 cubic yards of contaminated soil are indicated in the vadose zone.

Soil horizons in the vadose zone are very dense and fine grained: the logs predominantly report very hard silts and clays from 10 to 15 feet bgs and again below 30 feet to greater than 65 feet. There seems to be a laterally continuous sand horizon between 15 and 27 feet bgs, but the boring logs report few other sand beds greater than 5-feet thick that can be correlated. It is not clear that significant gasoline contamination has migrated to the capillary zone as discussed below.

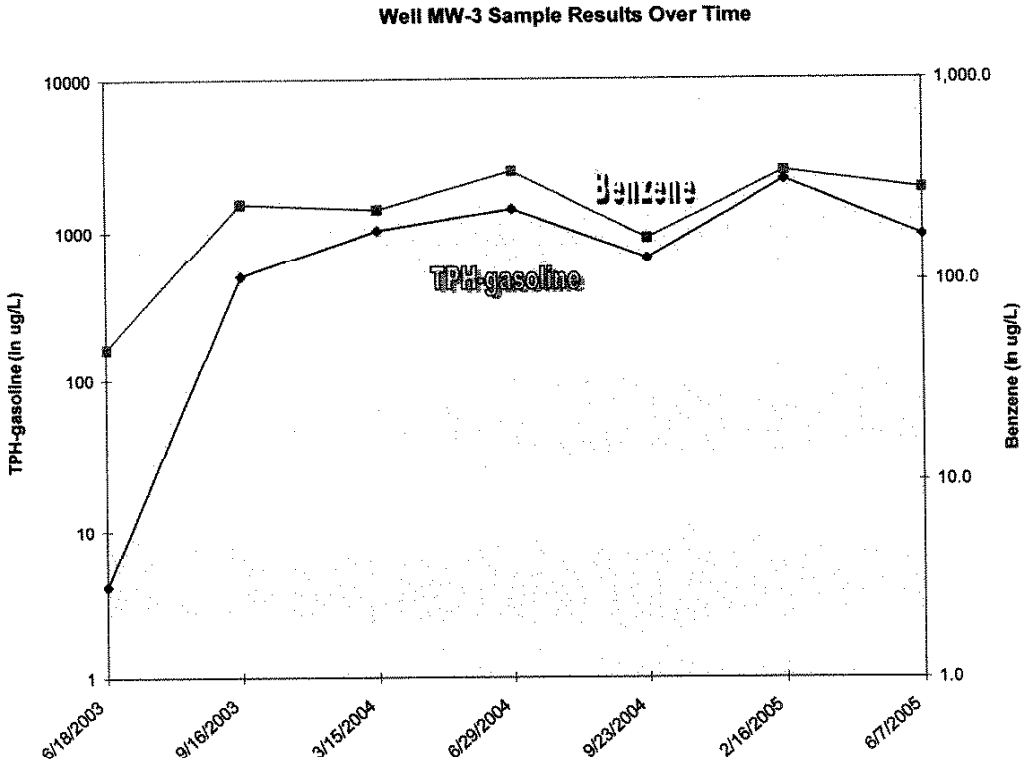
4.3 Capillary Zone

Gasoline migration in the capillary zone is characterized by lateral spreading, and if the release was severe enough, there can be a layer free product and a smear zone created during historic fluctuations in groundwater elevation. Minimal gasoline impact was detected in soil samples from 65 and 70 feet bgs (see Table 1); and this depth interval is considered to be the capillary zone because of its proximity to the groundwater surface at about 67 feet bgs. CMS did not observe hydrocarbon staining or odor in soils of the capillary zone. Free product was neither observed in any of the wells during drilling nor during two subsequent years of groundwater monitoring events.

Because there appear to be dissolved-phase gasoline constituents in groundwater, the maximum vertical extent of gasoline-impacted soil must extend to the capillary zone and first groundwater. Soil types in the capillary zone are again predominantly fine grained, especially in the MW-4 location.

4.4 Groundwater

The groundwater monitoring activities described in *Site Assessment Report* (CMS, 2003) and *Results of Continued Site Investigation* (CMS, 2004) were continued on a quarterly basis through June 2005. Groundwater in well MW-3, located in the former Tank #1 area, exhibits the highest level of contamination, where as much as 2,500 ug/L TPH and 320 ug/L benzene was detected during routine monitoring (see Table 2 and Figure 6). The chart below shows the pattern of repeated monitoring results for well MW-3 samples.



After two years of monitoring, the concentrations of benzene and TPH in the water samples from well MW-3 appear to have stabilized within a single order of magnitude. Further, with only two exceptions, benzene is routinely not detected in the downgradient wells MW-2 and MW-4. Well MW-2 is west of the contaminated zone and samples from that well on two occasions exhibited benzene at a concentration of 2.6 ug/L.

Figure 6 shows plan view interpretation the localized flow direction/gradient in June 2005 to be to the south-southwest at 0.0003 feet/foot. Figure 6 also shows the results of repeated groundwater monitoring events in tabular form and also the estimated extent of benzene-impacted groundwater. Based on the results for groundwater monitoring events for the past two years, it is unlikely the dissolved-phase gasoline and BTEX extend significantly down gradient (west).

4.5 Soil Vapor

Under certain conditions, released fuels in the subsurface present a continuous source of benzene (a known carcinogen) that can mobilize to human receptors. Soil vapor is not a likely threat to personnel at the Smog Centro site due to the relatively low concentrations of benzene in soil samples (43 mg/kg maximum), low permeability soil types (fine sands and silts), commercial exposure scenario, and "open-air" use as a vehicle test facility. Occupants of adjacent properties are not likely at risk due to physical separation from the contaminated zone (see Appendix C).

In October 2004, DEH advised the public of significant revisions to the vapor-risk guidelines and site management process, whereby naphthalene has been newly identified as a constituent of concern at

diesel-fuel and waste-oil contaminated sites. Because the site contaminants are associated with gasoline, the potential for significant human exposure to naphthalene and other potential VOCs is likely to be no greater than the exposure to benzene.

4.6 Site Assessment Conclusions

Based upon the findings of the site assessment investigation in 2003, CMS concluded:

- Previous retail fuel operations at this site involved the use of a UST system dating back to at least 1984.
- The potential for further releases from the UST system was removed in May 2000. The primary sources of historical fuel releases were identified as Tank #1 and/or the piping connections within the tank pit.
- The analytical screening results of representative soil samples by others during removal of the USTs indicate residual gasoline and BTEX in soil beneath Tank #1 only, but not diesel fuel, MTBE, or other target oxygenates above the method detection limits.
- CMS further investigated the nature and extent of the gasoline release and found soil contamination to extend to at least 60 feet bgs. The character of the residual gasoline impact appears most concentrated in soil from 10 to 35 feet deep. Very dense, fine-grained soil types (i.e., silts and clays) are dominant beginning at 30 feet until about 65 feet below ground surface.
- As much as 3,000 cubic yards of TPH-impacted soil is estimated beneath Tank #1 and in the upper 61 feet below grade. The residual soil impact certainly underlies the garage and office building, and it is likely to extend off property to the south beneath the market (see Figures 3 and 4).
- Groundwater beneath the site does not exhibit free product. The gradient between the site wells is essentially flat (<0.001 feet per foot), with a perceived groundwater flow direction that varies seasonally from south to west. Groundwater velocity in the contaminated zone is expected to be essentially nil due to the flat gradient. Regional groundwater flow patterns may actually trend more southward toward Paradise Creek or west toward San Diego Bay depending on location, seasonal changes and specific hydrogeologic factors.
- The extent and concentration of dissolved-phase hydrocarbons can be adequately characterized based on two years of monitoring of the three wells. Concentrations of TPH and BTEX were detected in groundwater samples collected from well MW-3, but generally not in samples from wells MW-2 and MW-4. The gasoline constituents detected in well MW-3 groundwater samples exceed the State's cleanup for the site area (esp. benzene at 1 ug/L); but TPH and BTEX concentrations during repeat sampling show a level trend.
- Additional gasoline constituents (MTBE and the other modern oxygenates) were not detected in repeated groundwater samples from MW-2 and MW-4; however, the initial monitoring results for well MW-3 indicate dissolved-phase MTBE just above the detection limit of 5 ug/L.
- The likely result of these factors: 1) cessation of the release and source removal efforts, 2) age of the release, and 3) low-permeability soil types and low groundwater velocity, is that the residual gasoline impact at this site is stable in the environment and attenuating naturally.

4.7 *Sensitive Receptor Survey and Site Conceptual Model*

A sensitive receptor survey was conducted based upon our current understanding of the gasoline release at this site and general understanding of the fate and transport of gasoline in the subsurface. The horizontal extent of contaminated soil appears limited to an area less than 80-feet diameter, and there is relatively low-level gasoline contamination in the groundwater near well MW-3. Free product has not been observed in the wells, nor is it expected to exist beneath the site. The potential for gasoline exposure to sensitive receptors within a 1000-foot radius from the subject site was investigated. The sensitive receptor survey focused on identifying existing land uses, existing groundwater resources/uses, and other potential sources of contamination. The survey was extended to include an evaluation of nearby groundwater production wells as a sensitive receptor.

CMS evaluated each exposure scenario using the DEH's site conceptual model and guidelines for exposure assessments. The pathways of exposure to sensitive receptors for this site are expected to lead to human health risk and water resources degradation. Human exposure occurs through dermal contact or ingestion of contaminated soil, groundwater, surface water, and/or inhalation of vapor.

4.7.1 Human Exposure Potential

The gasoline leakage was stopped for good when the tanks were removed in May 2000. Assuming the zone of contaminated soil and groundwater lies within the area shown on Figures 5 and 6, CMS does not suspect there are utilities or other man-made pathways that would enhance the migration of residual gasoline in the subsurface. Figure 7 shows the character of land uses in the site vicinity CMS observed during area tours in March 2004. According to CMS' observations of the current and anticipated land uses in the area, human contact is not likely because of the physical separation from the contaminated soil (less than 80-foot diameter ranging from 10 to 65 feet below ground surface.

According to our evaluation, the inhalation pathway for human exposure does not exist. The soil-vapor survey did not find benzene or other target analytes at five feet below ground surface, and the DEH's Vapor Risk Model simulation does not indicate an increased cancer risk for commercial or residential scenarios (see Appendix C). Therefore, the occupants of onsite, adjacent and nearby residential or commercial buildings do not appear to be at risk from residual subsurface gasoline.

4.7.2 Groundwater as a Receptor and a Pathway of Human Exposure

As stated earlier in the CAP, the site lies within the National City Hydrologic Area (HA 8.30) of the Pueblo San Diego Hydrologic Unit. Groundwater in HA 8.30 is designated for existing beneficial use as a municipal water supply, though the site and surrounding community are provided with clean tap water by San Diego County Water Authority.

CMS' site assessment investigation and subsequent groundwater monitoring events confirm groundwater at approximately 67 feet below ground surface at the Smog Centro site, and the samples from well MW-3 show the groundwater beneath the former Tank #1 to be impacted with dissolved-phase gasoline (i.e., TPH-gasoline and BTEX as reported on Table 2 and Figure 6). CMS' analysis of groundwater data shows a very shallow gradient (consistently less than 0.001 feet/foot) with a of

groundwater data show a very shallow gradient (consistently less than 0.001 feet/ft) with a variable flow direction ranging from west to south. The groundwater velocity beneath the site is expected to be relatively slow due to the shallow gradient. Except for the samples from wells MW-2 which detected trace benzene in March 2004 and February 2005, monitoring of the downgradient wells has detected little or no benzene in the groundwater. In fact, repeat monitoring events indicate the plume is stable in the environment due to ongoing natural processes.

Potable water in the site vicinity is provided at the tap by the municipality, and Sweetwater Authority is known to produce groundwater from their "National City Wells." CMS obtained characteristics for the Sweetwater Authority's wells during a telephone conversation with Mr. Michael Garrod in November 2005. According to Mr. Garrod, the production wells are located within 500 feet southeast of the intersection of Division Street and Interstate 805 (see Figure 8) and constructed as follows:

- NC#2 was drilled in 1957 with top of casing at +94 feet Mean Sea Level datum (msl), total depth of 800 feet, and screen in five intervals between 360 and 793 feet below ground surface. This well produces at a rate of 600 gallons per minute (gpm).
- NC#3 was drilled in 1983 with top of casing at +89 feet msl, total depth of 810 feet, and screen from 690 to 740 and 750 to 800 feet below ground surface. This well produces at a rate of 700 gallons per minute (gpm).
- NC#4 was drilled in 2003 with top of casing at about +80 feet msl, total depth of 680 feet, and screen at 380 to 450 and 490 to 670 feet below ground surface. This well produces at a rate of 750 gallons per minute (gpm).

The water is produced from up to two of these three wells at a time, disinfected, and then added to the pipeline to supplement stored and imported water already in the system. Mr. Garrod further explained that El Toyon Park has a series of monitoring wells used by Sweetwater Authority. CMS verified the location of the three National City Wells and two El Toyon monitoring wells during a field inspection in November 2005 (see Figure 8).

Because the gasoline plume at Smog Centro appears stable within the site boundaries, and the nearest production wells are separated by a greater than 3,600 feet horizontally and 300 feet vertically, CMS concludes there is no likely exposure to human or ecological receptors via the National City Production Wells. Based upon this site-specific assessment and similar experience in San Diego County, CMS also concludes that future transport (if any) of the dissolved-phase hydrocarbons is not likely to degrade beneficial water resources.

4.7.3 Surface Water Exposure Potential

As stated earlier in this CAP, surface water in HA 8.30 is designated with existing beneficial use for non-contact recreation, wildlife habitat, and rare, threatened or endangered species habitat, but it is not used for municipal "drinking" water supply (RWQCB, 1994). Surface water does not normally occur on the site or surrounding areas. No surface water bodies were identified during CMS' tour of the land within a 1000-foot radius of the site. Based upon this site-specific assessment and similar experience in San Diego County, CMS concludes that future transport (if any) of the dissolved-phase hydrocarbons is not likely to degrade beneficial surface water resources.

5.0 SITE MITIGATION ATERNATIVES AND FEASIBILITY STUDY

The character and extent of the subsurface contamination are sufficiently known to identify reasonable site mitigation alternatives and to evaluate the feasibility of active and passive remediation methods. The contaminated soil and groundwater appear stable in the environment since the release was ceased over 5 years ago when the tanks were removed. Our risk-based analysis demonstrates that no further action with long-term, passive remediation is sufficiently protective of public health and the environment as described below.

5.1 Proposed Cleanup Levels

According to current regulatory requirements, the long term cleanup goals for all UST release sites are in line with California's non-degradation policy to maintain drinking water standards. In practice, there are many UST release sites in Western San Diego County where it has been deemed impractical and unnecessary to restore drinking water standards. At the Smog Centro site, CMS believes groundwater treatment is not likely to reduce the petroleum contaminants to drinking water standards at a significantly faster rate than will occur naturally. Further, active soil remediation is infeasible by measure of necessity alone. Therefore, CMS and the Abbott Family Trust propose the following alternate cleanup levels for the site consistent with protecting human heath and the environment while preserving the present land use and USTCF reserves.

Proposed Cleanup Levels

Lab Constituent	Lab Method	Soil Level	Water Level	Comments
TPH (gasoline range)	EPA 8015M	36,000 mg/kg	5.0 mg/L	No free product
TPH (diesel fuel and extended range)	EPA 8015M	10 mg/kg	1.0 mg/L	No free product
Benzene	EPA 8021 or 8260B	43 mg/kg	1.0 mg/L	No vapor risk to human health
Toluene	" "	1,400 mg/kg	1.0 mg/L	
Ethylbenzene	" "	550 mg/kg	1.0 mg/L	
Total Xylenes	" "	5,300 mg/kg	1.0 mg/L	
MTBE	EPA 8260B	31 mg/kg	0.5 mg/L	
TBA	EPA 8260B	0.32 mg/kg	0.5 mg/L	

5.2 Overview and Limitations of Site Mitigation Alternatives

As requested in the September 23, 2004 letter from the DEH, CMS has selected one passive and one active site mitigation alternative for study in the CAP. In our opinion, the cleanup levels proposed above have been met, and there are no detrimental effects of leaving the gasoline contamination in

place to degrade naturally by *Remediation by Natural Attenuation (RNA)*. Alternatively, the most-effective way to mitigate gasoline-contaminated soil, and thus reduce the mass of contamination and exposure potential to groundwater, is by method of *Soil Vapor Extraction (SVE)*.

The project duration (and cost) is highly dependant upon the original mass of gasoline, the proposed cleanup levels, the system design and operating potential, and also the physical properties of the impacted soil. The original contaminant mass is only a crude estimate because of potentially compound errors caused by conservative assumptions used for the density, volume and average concentration of gasoline for the impacted soil. It is most-likely that the released gasoline is sufficiently immobile at this time 5+ years after the USTs were last used. In lieu of active remediation in an attempt to meet California's drinking water standards - which is typically awkward, expensive and disruptive to the public - CMS and Mrs. Abbott propose a cost-effective, technically feasible, and safe mitigation strategy.

5.2.1 Chemical/Physical Properties for Soil and Contaminants

Gasoline is almost 100% volatile and biodegradable. Oxygen and microorganisms in the contaminated zone are generally known to reduce gasoline to water and carbon dioxide, and extraction of the contaminant-laden soil vapor via SVE typically enhances the volatilization and biodegradation processes. However, long-term reduction in the less permeable, lower vadose zone at this site can only be accomplished by natural processes (e.g., diffusion and biodegradation).

Vadose zone soils beneath the site consist of interbedded silt and sand from ground surface to approximately 30 feet below grade (upper vadose), and there is a distinct and laterally continuous clay layer from 30 to 65 feet below grade (lower vadose). Air permeability in the upper vadose soils is higher (perhaps 1,000 times more) than the soils of the lower vadose zone. The mass of contamination in the lower vadose zone is likely to persist long after an SVE system becomes mass limited (indicated by an asymptotic recovery curve), and it can only be reduced further by natural attenuation.

5.2.2 Estimating the Mass of Gasoline Contamination

Though trace concentrations of TPH and target VOCs are present in groundwater and soil samples from greater than 45 feet deep, the major source of residual contamination is the upper vadose zone at 10 to 33 feet below ground surface. The estimated extent of impacted soil is shown on Figure 3, and the gasoline extent, soil types and sample concentrations are depicted on the cross section on Figure 4. The upper vadose zone is hard silt and dense sand at those depths where gasoline has accumulated beneath the suspect release source (Tank #1).

The soil sample results from the UST removal and soil borings B-1 and MW-3 show the highest concentrations of TPH came from the beneath Tank #1 at 10 to 33 feet below ground surface. CMS estimated the mass of TPH in the soil by multiplying the soil volume by the soil density and the concentration of TPH. Using the total contaminated soil volume of 3,000 cubic yards, soil densities of 110 pounds per cubic foot (pcf) for silt/clay soils or 120 pcf for silt/sand soils, and the rough average TPH concentrations for various depth zones, CMS estimates the mass of TPH in the upper

vadose zone to be 18,000 pounds. This compares to 1,900 pounds TPH in clay-rich soils from 35 to 61 feet deep). This estimating method serves to identify the upper vadose zone as bearing 90% of the TPH, which is the most-significant factor to consider for site mitigation purposes. However, less permeable soils in the lower vadose zone seem to have limited the rate of downward migration to sensitive groundwater. Even if all the TPH were removed from the upper vadose, it's likely that TPH trapped in the lower vadose will continue to impact groundwater at the present level.

5.2.3 Description of Site Mitigation Alternatives

Remediation by natural attenuation (diffusion and biodegradation) is a passive and least-costly approach to manage gasoline contaminated sites. Indigenous organisms in the soil and groundwater have the potential to remove a large mass of contaminants in the presence of sufficient oxygen and nutrients. The benefits of this process include no site disruption and low cost, while the main detractor is the relatively long project duration. Because this cleanup method is passive, it can take as much as 200 years to completely degrade the gasoline in the subsurface.

The natural movement or soil vapor (and diffusion/biodegradation of the contaminants) can be enhanced by SVE, and thus, a large portion of the contamination can be removed relatively quickly at first. With proper SVE design, multiple vapor extraction wells are operated to influence air movement within the entire contaminated zone, the circulation causes the gasoline to volatilize into the air stream, and the gasoline-laden vapor is treated to air discharge standards. However, even the best designed remediation systems become ineffective due to preferential flow and contaminant mass limitations in the subsurface. Once these limits are reached, equipment operating inefficiencies are marked by escalating utility costs way before the site is "clean."

5.3 Feasibility Study

The site mitigation alternatives for this CAP are *Remediation by Natural Attenuation (RNA)*, the passive method, and *Limited Soil Vapor Extraction (LSVE)*, an active form of site remediation that can rapidly reduce the mass of gasoline contamination in permeable soils of the vadose zone. RNA is ongoing at the fringes of the plume where oxygen, nutrients, and the gasoline are present in a mixture that is beneficial to the population of indigenous microorganisms. LSVE would target the most contaminated zone, which is usually anaerobic and toxic to microorganisms, and is likely recover a significant mass of gasoline within a 1 year operating period. Both of these alternatives rely on the natural processes of volatilization and biodegradation in the end to recover/remove the site contaminants and restore groundwater quality.

Groundwater monitoring results indicate the plume is stable in the environment. The best indication at this site of ongoing RNA in groundwater beneath the site is the periodic detection of benzene in the downgradient well, MW-2, where benzene was reduced below detection before each subsequent monitoring event (see Figure 6). Further, soil vapor does not appear to emit benzene to the shallow subsurface (see Table 3). Therefore, the gasoline contamination at this site appears to be degrading on the edges at least as rapidly as gravity and diffusive forces tend to spread the contamination. RNA is essentially a "no cost" alternative because future groundwater monitoring is not proposed. Instead, the existing monitoring wells would be destroyed and the case closed out with DEH and USTCF (total

cost of ~$6,000), and Smog Centro would continue their business without environmental concern for contamination underlying the property.

The application of LSVE for a one year operating period at the Smog Centro site could reduce the gasoline mass and also shorten the time needed for groundwater quality to attain drinking water standards by 50% or more. If the LSVE alternative were implemented, CMS anticipates a project to consist of the following general tasks:

- Workplans, Permits and Notifications – agency oversight/permits, planning/scheduling
- Well Drilling and Capital Equipment – three SVE wells, materials/equipment, services
- Site Operation and Management – 12 months of services, equipment, utilities, monitoring
- Post-Remediation Report – summary of operating results/residual site conditions
- Follow up Consultation for Closure – well destruction and consulting services

Based on previous site-remediation experience, CMS estimates the cost will be $130,000 to set up/operate an SVE system for one year and comply with other DEH requirements through closure within 18 months.

RNA is appropriate for the Smog Centro site because alternative cleanup levels have been met and the residual hydrocarbons do not pose a significant risk to human health or the environment. Conversely, LSVE is not appropriate for this site because it is not necessary to protect human health or the environment and it will cost at least 20 times more than RNA in the next 18 months. LSVE could shorten the period needed for groundwater to attain drinking water standards by perhaps 100 years (+/- 50 years), but site conditions don't appear to warrant active remediation at this time.

6.0 SELECTED ALTERNATIVE

CMS and Mrs. Abbott have selected RNA as the most cost-effective alternative that is sufficiently protective of human health and the environment. LSVE is the proven method that could significantly reduce the contaminant mass in the near term at the Smog Centro site; however, LSVE would be ineffective in reducing the contaminant mass in the lower vadose zone. The groundwater impact would likely linger for hundreds of years in either case. The feasibility study indicates that passive remediation by natural attenuation is just as effective as SVE in protecting human health and the environment without all the disruption and expense. CMS believes that complete removal of the gasoline residue by either method (in order to meet drinking water standards) would likely take in excess of 200 years.

Therefore, we propose not to expend additional resources to mitigate the site at this time. Instead, we have chosen a no action alternative, whereby:

- the nature and extent of contamination are sufficiently known,
- repeat groundwater monitoring events have demonstrated the plume is stable,
- there is no apparent risk to leaving the contamination in place, and
- active cleanup methods need only be considered if and when the land use changes.

As can best be determined from the available site assessment and monitoring information, the site conditions presently conform to the proposed alternate cleanup levels. Monitoring is unnecessary because the observed levels of petroleum impact are not likely to become more mobile or severe in the future. In fact, naturally-occurring processes have been reducing the mass of contamination for some time and will continue to due so without intervention. Without significant time and expense, the site use can be preserved for the Smog Centro business while they continue to operate at this location. The site mitigation strategy can be altered if land use were to change from the present commercial use in the future. Any future redevelopment plan should revisit the risk assessment and common sense questions/answers presented in Appendix C of this CAP.

7.0 RECOMMENDATION

On behalf of the Abbot Family Trust, CMS recommends the DEH consider this Corrective Action Plan to substantially fulfill all requirements for mitigating this former UST site. Without further indication of a risk to public health of the environment, we request DEH to review and concur with this CAP as soon as possible.

8.0 LIMITATIONS

Subsurface investigations contain an inherent degree of uncertainty due to heterogeneity of the substrate and the limited number of available observations and data points. The conclusions presented in this report are professional opinions founded in specific information provided by others, the data collection efforts described in this report, and CMS's general experience in the field of subsurface environmental investigations and cleanups. CMS offers no warranty or guarantee, whether express or implied, except that these opinions have been developed in good faith and in accordance with the currently-accepted standards of practice.

9.0 REFERENCES CITED

CMS, 2001; *Report of Findings, 404 Highland Avenue, National City, CA,* June 26

CMS, 2001; *Updated Site Assessment Workplan, 404 Highland Ave, National City, CA*, October 11

CMS, 2003; *Site Assessment Report, 404 Highland Avenue, National City, CA*, October 27.

CMS, 2004; *Workplan for Continued Site Assessment, 404 Highland Avenue, National City, CA*, February 2.

CMS, 2004; *Results of Continued Site Investigation, 404 Highland Avenue, National City*, July 14.

CMS, 2004; *Recommendation for Groundwater Monitoring, 404 Highland Avenue, National City*, August 17.

CMS, 2005; *Groundwater Monitoring Update Report, 404 Highland Avenue, National City, CA*, May 10.

DEH, 2004; *Site Assessment and Mitigation Manual*, San Diego County Department of Environmental Health, updated 2005

Kennedy and Tan, 1977; *Geology of National City, Imperial Beach, and Otay Mesa Quadrangles, Southern San Diego Metropolitan Area, California, Map Sheet 29*, published by California Division of Mines and Geology.

RWQCB, 1994; Water Quality Control Plan and Basin Plan Update, San Diego Basin (9), California Regional Water Quality Control Board

TABLES

TABLE 1
Summary of Analytical Results - Soil Samples
404 Highland Avenue, National City, CA

Sample Location - Date	Sample Identification - Depth in Feet	TPH		Volatile Organic Compounds				
		gasoline (mg/kg)	diesel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)
UST Pits & Pipelines	P1-3	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	P2-3	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	P3-3	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
5/31/2000	T1-11	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T2-11	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T3-12	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T4-14	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T5-16	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T6-17 (Tank #1)	23,000	ND(10)	ND (5)	85	84	1300	ND (5)
	T7-18	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	T8-5	ND(10)	ND(10)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)

Sample Location - Date	Sample Identification - Depth in Feet	TPH		Volatile Organic Compounds				
		gasoline (mg/kg)	diesel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Oxygenates (mg/kg)
Soil Boring B-1	B1@10'	26,000	--	ND (2.5)	79	110	2400	--
	B1@15'	36,000	--	43	1400	550	5300	31 *
	B1@20'	13,000	--	16	420	160	1400	--
5/25/2001	B1@25'	4,100	--	4.4	110	66	490	--
	B1@30'	920	--	ND (0.5)	18	16	110	0.36 *
	B1@35'	2,900	--	8.8	180	70	420	--
	B1@40'	180	--	2.8	13	3.0	18	--
	B1@45'	35	--	2.3	6.1	0.64	4.0	--
	B1@50'	23	--	0.75	1.8	0.19	1.1	--
Soil Boring B-2/MW-2	10	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	15	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	20	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
5/27/2003	25	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	30	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	35	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	40	ND (0.5)	--	0.014	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	45	ND (0.5)	--	0.024	ND (0.005)	0.010	ND (0.010)	ND (0.020)#
	55	ND (0.5)	--	0.012	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	60	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	65	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	0.008 *
	70	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
Soil Boring B-3/MW-3	10	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (20)#
	15	0.9	--	ND (0.005)	0.008	ND (0.005)	ND (0.010)	0.460 *
	20	0.6	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	0.073 #
5/28/2003	25	2,880	--	3.0	77	44.8	243	ND (4)#
	30	4,620	--	7.4	166	77.8	384	ND (4)#
	35	1,230	--	4.6	63.2	20.6	88.8	ND (4)#
	40	226	--	1.19	12.9	3.87	15.0	0.166 *
	45	16	--	0.775	3.56	0.435	1.71	ND (0.1)#
	50	1.9	--	0.088	0.307	0.039	0.182	0.022 #
	55	1.2	--	0.089	0.229	0.027	0.103	ND (0.020)#
	60	0.8	--	0.085	0.143	0.020	0.075	ND (0.020)#
	65	ND (0.5)	--	0.024	0.012	ND (0.005)	ND (0.010)	0.017 *
	70	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#

TABLE 1

Summary of Analytical Results - Soil Samples

404 Highland Avenue, National City, CA

Sample Location - Date	Sample Identification - Depth in Feet	TPH		Volatile Organic Compounds				
		gasoline (mg/kg)	diesel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Oxygenates (mg/kg)
Soil Boring B-4/MW-4	10	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	20	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	25	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
5/28-29/2003	30	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	**0.011 ***
	35	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	40	**2.0**	--	**0.199**	**0.325**	**0.045**	**0.225**	ND (0.020)#
	45	**2.0**	--	**0.412**	**0.087**	**0.074**	**0.263**	ND (0.020)#
	50	ND (0.5)	--	**0.120**	ND (0.005)	**0.02**	**0.026**	ND (0.020)#
	55	ND (0.5)	--	**0.093**	ND (0.005)	**0.016**	ND (0.010)	ND (0.020)#
	60	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#
	65	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.005) *
	70	ND (0.5)	--	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.020)#

Explanation:

TPH - Total petroleum hydrocarbons, quantified as gasoline and diesel fuel by DOHS EPA Method 8015

Volatile Organic Compounds - BTEX and MTBE by modified EPA Method 8020; Oxygenates by EPA Method 8260B

mg/kg - Milligrams per kilogram

ND(10) - Not detected (detection limit)

31 * - indicates result for MTBE by EPA Method 8260B; DIPE, ETBE, TAME and TBA not detected except sample 3-15 with 0.32 mg/kg TBA

20# - indicates result for MTBE by EPA Method 8021B only, not confirmed by EPA 8260B

-- Not analyzed

TABLE 2
Summary of Field and Laboratory Results
Groundwater Monitoring Wells
404 Highland Avenue, National City, California

Well ID Elevation*	Date of Measurement/ Collection	Depth to Water (ft) Below TOC	Relative Groundwater Elevation (ft)	Observable LPH? (Yes/No)	TPH	Volatile Organic Compounds									
					Gasoline (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Total Xylenes (ug/l)	MTBE (ug/l)	DIPE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	Naphthalene (ug/l)
MW-2	5/30/2003	66.93	7.77	No	Not sampled										
	6/14/2003	66.94	7.76	No	Not sampled, well development only										
74.70	6/18/2003	66.96	7.74	No	ND(50)	ND(1)	ND(1)	ND(1)	ND(3)	ND(2)	ND(2)	ND(2)	ND(2)	ND(10)	--
	9/16/2003	67.02	7.68	No	ND(20)	ND(1)	ND(1)	ND(1)	ND(3)	ND(1)	ND(1)	ND(1)	ND(1)	ND(50)	--
	3/15/2004	67.07	7.63	No	ND(500)	2.6	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	6/29/2004	67.17	7.53	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	9/23/2004	67.34	7.36	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	2/16/2005	67.08	7.62	No	ND(500)	2.6	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	ND(5)
	6/7/2005	66.28	8.42	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
MW-3	5/30/2003	67.26	7.78	No	Not sampled										
	6/14/2003	67.28	7.76	No	Not sampled, well development only										
75.04	6/18/2003	67.30	7.74	No	163	2.9	ND(1)	ND(1)	ND(3)	5.4	ND(2)	ND(2)	ND(2)	ND(10)	--
	9/16/2003	67.35	7.69	No	1530	105	142	14.1	145	ND(5)	ND(5)	ND(5)	ND(5)	ND(250)	--
	3/15/2004	67.40	7.64	No	1400	180	300	55	500	ND(2.5)	ND(12)	ND(12)	ND(12)	ND(62)	--
	6/29/2004	67.52	7.52	No	2500	230	390	41	360	ND(5)	ND(25)	ND(25)	ND(25)	ND(120)	--
	9/23/2004	67.68	7.36	No	900	130	190	26	200	ND(5)	ND(25)	ND(25)	ND(25)	ND(120)	--
	2/16/2005	67.41	7.63	No	2500	320	500	120	530	ND(5)	ND(25)	ND(25)	ND(25)	ND(120)	ND(50)
	6/7/2005	66.62	8.42	No	1900	170	180	57	360	2.3	9.6	ND(25)	ND(25)	ND(120)	--
MW-4	5/30/2003	66.69	7.77	No	Not sampled										
	6/14/2003	66.70	7.76	No	Not sampled, well development only										
74.46	6/18/2003	66.73	7.73	No	ND(50)	ND(1)	ND(1)	ND(1)	ND(3)	ND(2)	ND(2)	ND(2)	ND(2)	ND(10)	--
	9/16/2003	66.78	7.68	No	ND(20)	ND(1)	ND(1)	ND(1)	ND(3)	ND(1)	ND(1)	ND(1)	ND(1)	ND(50)	--
	3/15/2004	66.83	7.63	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	6/29/2004	66.94	7.52	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	9/23/2004	67.09	7.37	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--
	2/16/2005	66.84	7.62	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	ND(5)
	6/7/2005	66.05	8.41	No	ND(500)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.5)	ND(1)	ND(5)	ND(5)	ND(5)	ND(25)	--

Explanation:
Elevation* - top of casing surveyed on 5/30/2003 relative to an arbitrary benchmark near southwest corner of site assumed to be +75.00 feet.
LPH - Liquid-phase hydrocarbon (or "free product")
TPH - Total petroleum hydrocarbons, quantified as gasoline by EPA Method 8015M (GC-FID) or 8260B (GC/MS)
Volatile Organic Compounds by EPA Method 8260B
ug/l - Micrograms per liter
ND(1) - Not detected (less than reporting limit)
-- Not analyzed.

TABLE 3
Summary of Field and Laboratory Results
Soil Vapor Survey
404 Highland Avenue, National City, California

Sample ID	Sample Date	Depth (ft)	Volatile Organic Compounds									
			Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	m,p-Xylene (ug/l)	o-Xylene (ug/l)	Methyl tert-butyl ether (ug/l)	Di-isopropyl ether (ug/l)	Ethyl tert-butyl ether (ug/l)	Tert-amyl methyl ether (ug/l)	Tert-butyl alcohol (ug/l)
SV1	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV2	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV3	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV4	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV5	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV6	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV7	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV7 dup	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV8	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)
SV9	5/7/2004	5.0	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)

Explanation:
Volatile Organic Compounds by EPA Method 8260B; Group A fuel compounds per SAM Manual (DEH, 2002)
ug/l - Micrograms per liter
ND (1) - Not detected (detection limit times dilution factor)

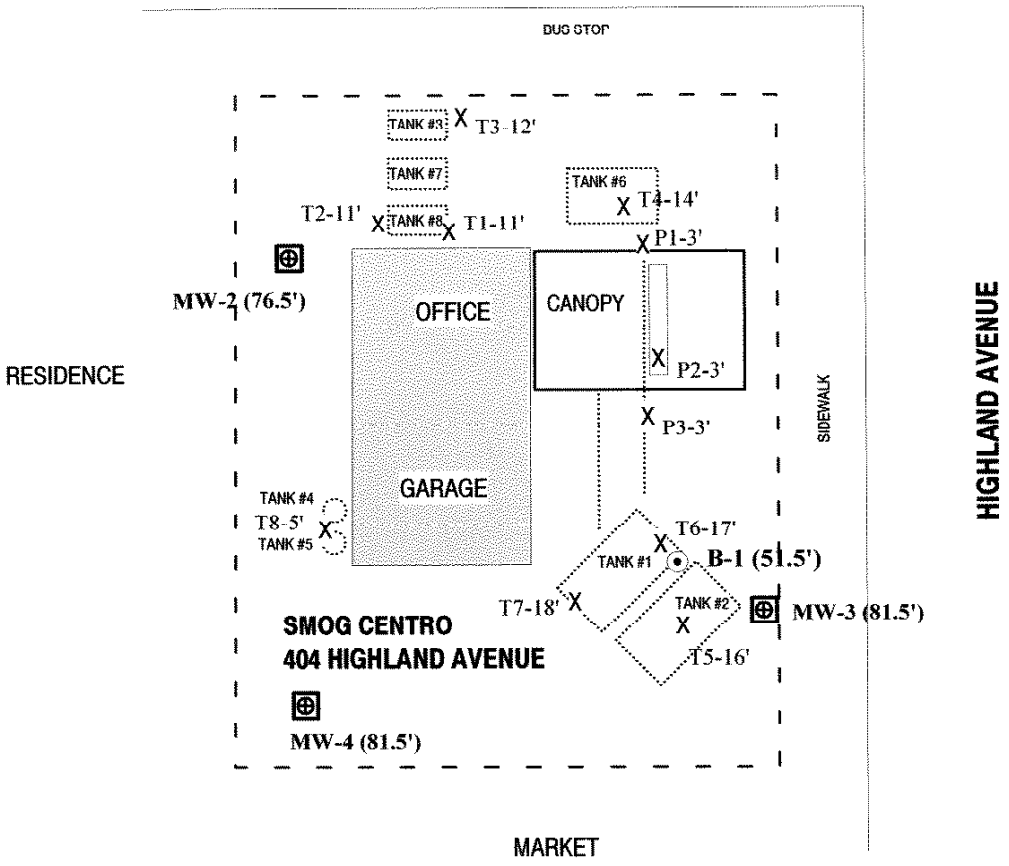
FIGURES

NORTH

FIGURE 1 -
SITE LOCATION MAP

HIGHLAND TIRE AND SERVICE
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA

COMPLIANCE MONITORING SERVICES



NORTH

0 20 40

APPROXIMATE SCALE IN FEET

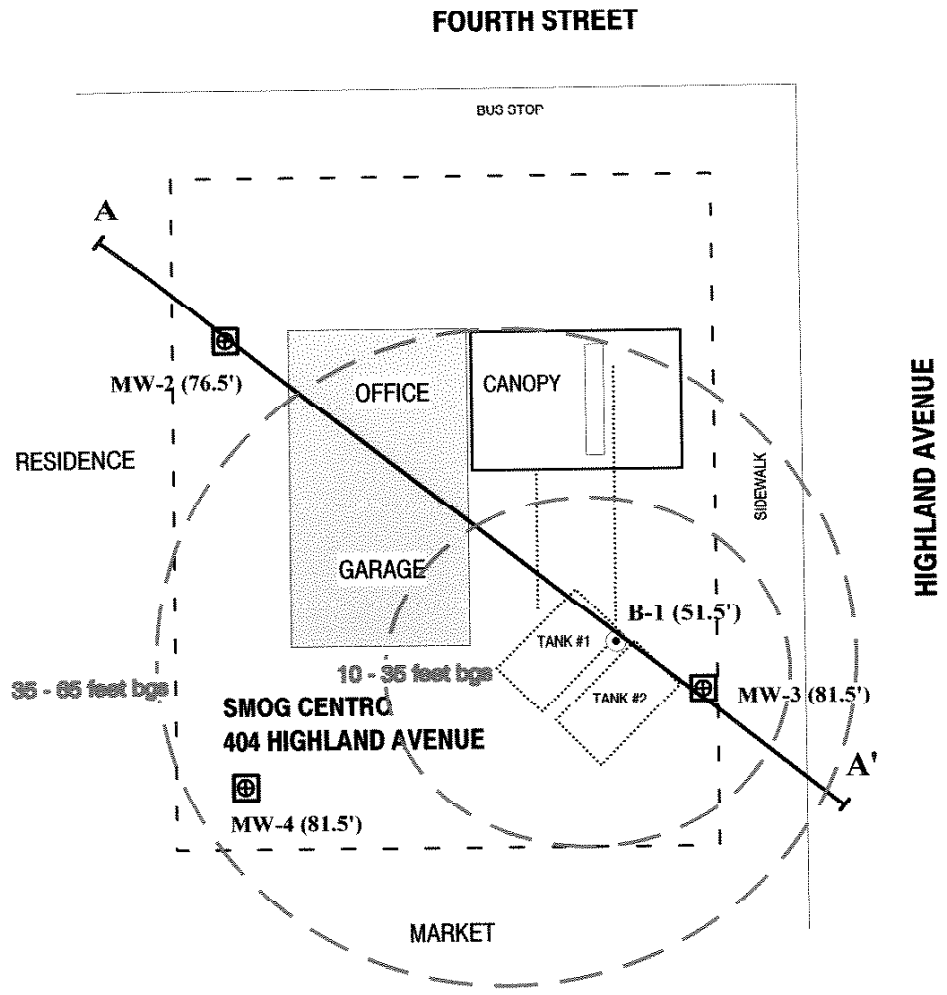
EXPLANATION

TANK #6	LOCATION AND IDENTIFICATION OF UNDERGROUND STORAGE TANKS REMOVED ON MAY 31, 2000
X T3-12	SOIL SAMPLE ID AND DEPTH OF COLLECTION FROM TANK/PIPELINE REMOVALS IN MAY 2000
B-1 (51.5')	SOIL BORING WITH ID AND TOTAL DEPTH DRILLED IN MAY 2001
MW-2 (76.5')	MONITORING WELL WITH ID AND TOTAL DEPTH DRILLED IN MAY 2003

COMPLIANCE MONITORING SERVICES

FIGURE 2 - SITE PLAN

SMOG CENTRO
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA



NORTH

0 20 40

APPROXIMATE SCALE IN FEET

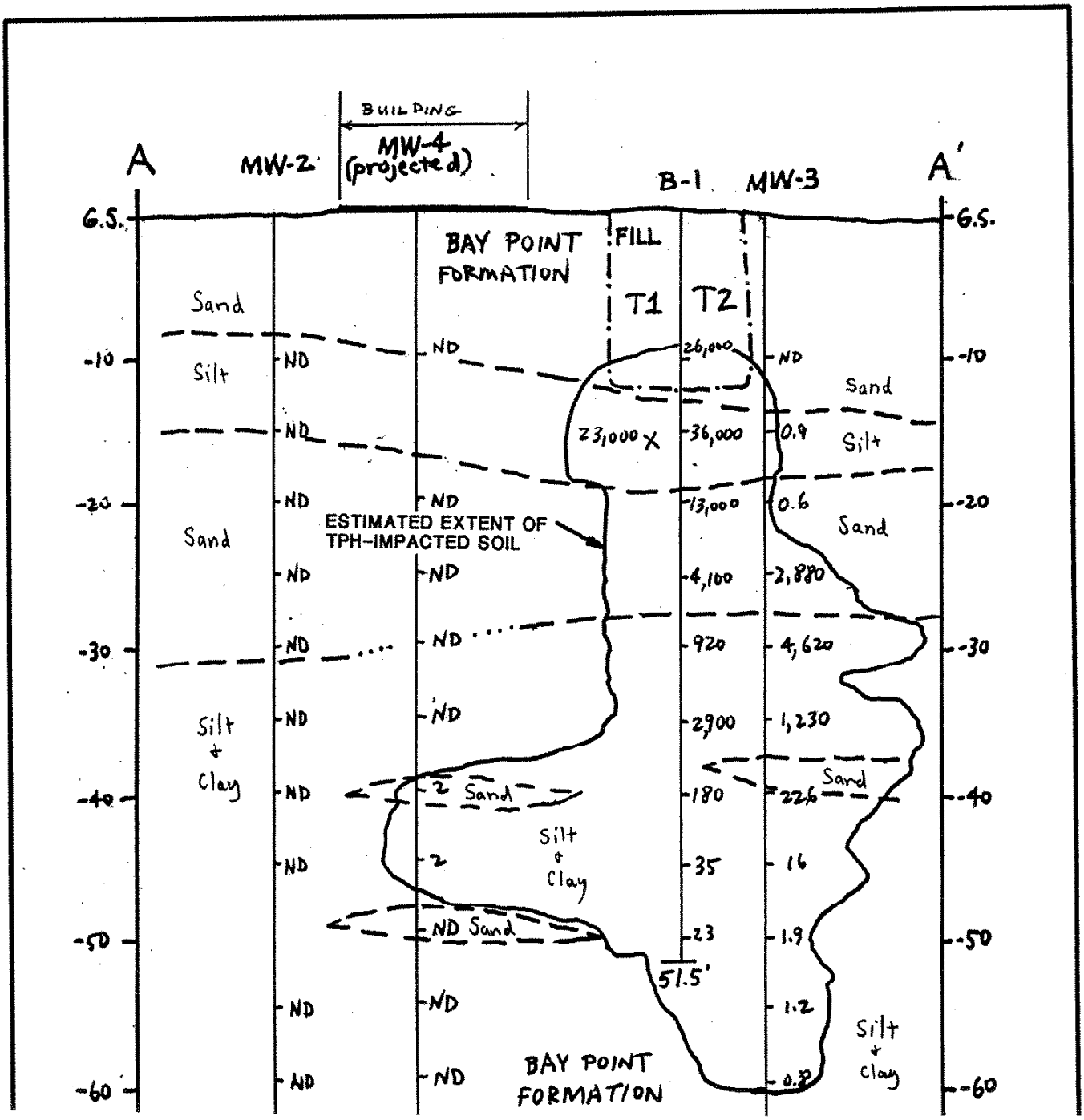
EXPLANATION

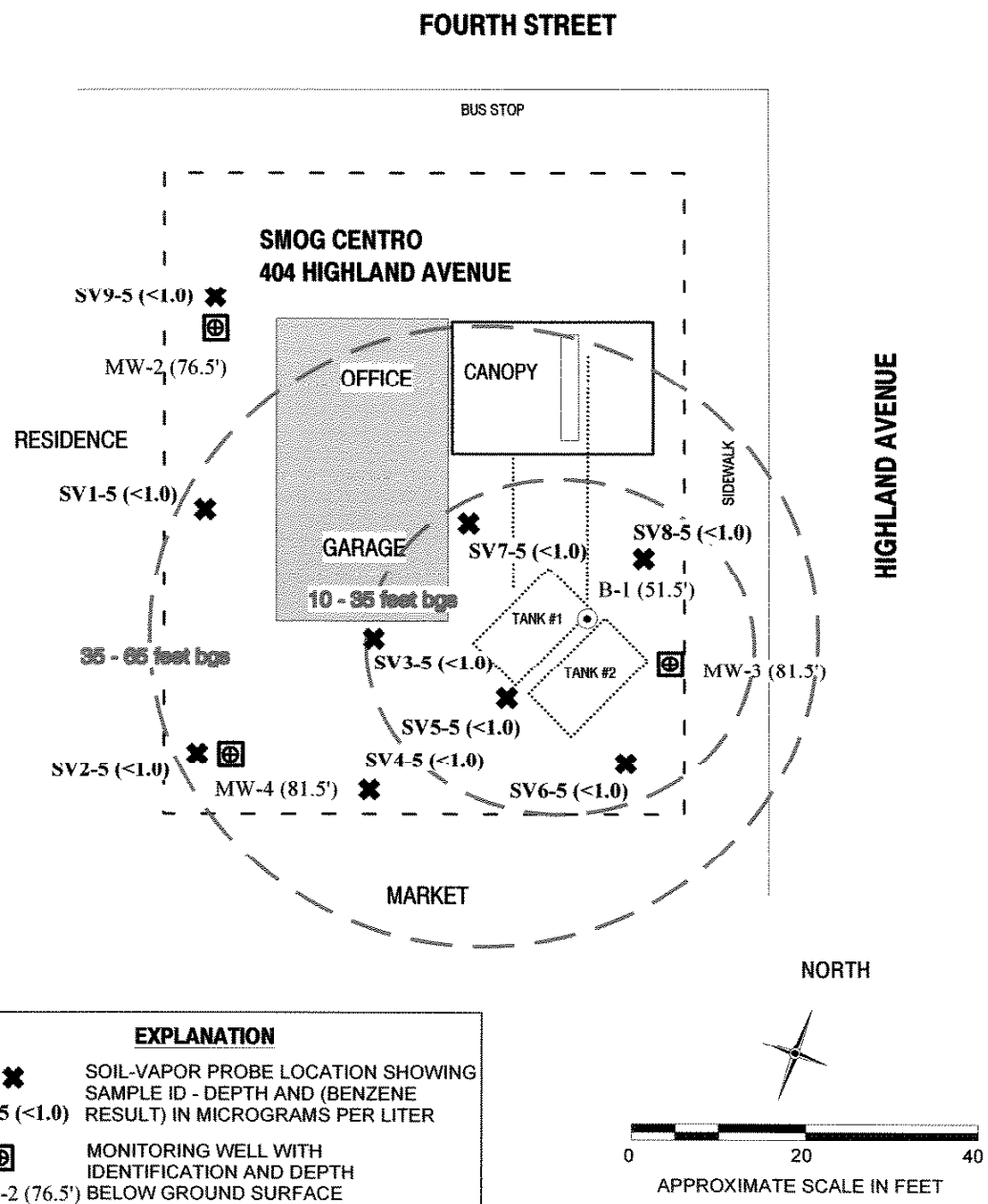
- MW-2 (76.5') — MONITORING WELL WITH IDENTIFICATION AND DEPTH BELOW GROUND SURFACE
- B-1 (51.5') — LOCATION OF SOIL BORING WITH IDENTIFICATION AND DEPTH BELOW GROUND SURFACE
- TANK #6 — LOCATION AND IDENTIFICATION OF UNDERGROUND STORAGE TANKS REMOVED ON MAY 31, 2000
- A — A' CROSS-SECTION LOCATION
- ESTIMATED EXTENT OF TPH-IMPACTED SOIL PRESENTED IN TWO RANGES OF DEPTH BELOW GROUND SURFACE (bgs)

COMPLIANCE MONITORING SERVICES

FIGURE 3 - ESTIMATED EXTENT OF TPH-IMPACTED SOIL

HIGHLAND TIRE AND SERVICE
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA


A
MW-2
BUILDING
MW-4 (projected)
B-1
MW-3
A'
G.S.
BAY POINT FORMATION
FILL
T1
T2
Sand
Silt
Sand
Silt & Clay
Sand
Silt & Clay
BAY POINT FORMATION
ESTIMATED EXTENT OF TPH-IMPACTED SOIL
ND
23,000 X
26,000
36,000
13,000
4,100
920
2900
180
35
23
51.5'
0.9
0.6
2,880
4,620
1,230
226
16
1.9
1.2
0.2
-10
-20
-30
-40
-50
-60



EXPLANATION

- SV1-5 (<1.0): SOIL-VAPOR PROBE LOCATION SHOWING SAMPLE ID - DEPTH AND (BENZENE RESULT) IN MICROGRAMS PER LITER
- MW-2 (76.5'): MONITORING WELL WITH IDENTIFICATION AND DEPTH BELOW GROUND SURFACE
- B-1 (51.5'): LOCATION OF SOIL BORING WITH IDENTIFICATION AND DEPTH BELOW GROUND SURFACE
- ESTIMATED EXTENT OF TPH-IMPACTED SOIL PRESENTED IN TWO RANGES OF DEPTH BELOW GROUND SURFACE (bgs)

FIGURE 5 - SOIL EXTENT MAP WITH SOIL VAPOR SAMPLING LOCATIONS - MAY 2004

SMOG CENTRO
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA

COMPLIANCE MONITORING SERVICES

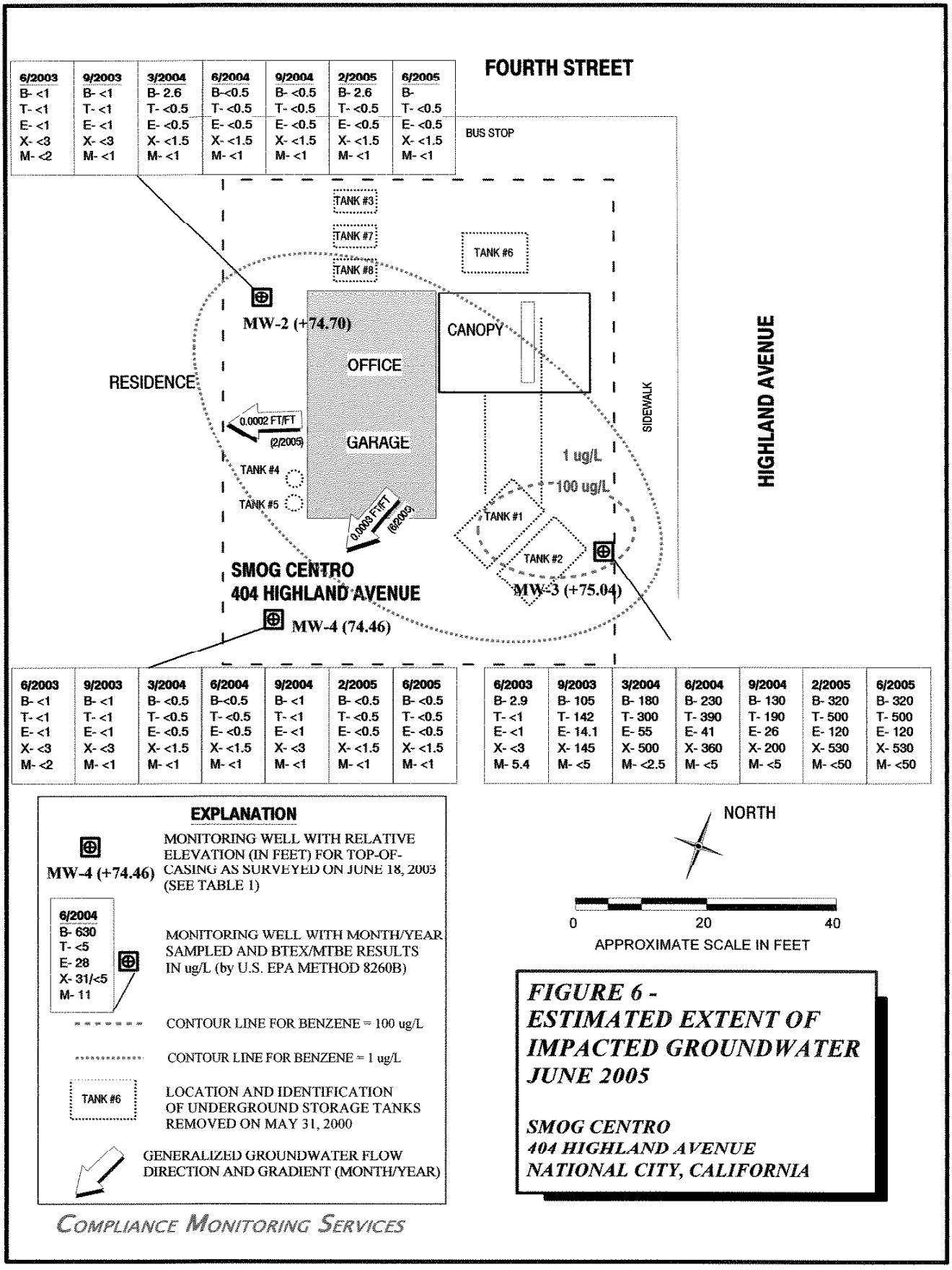
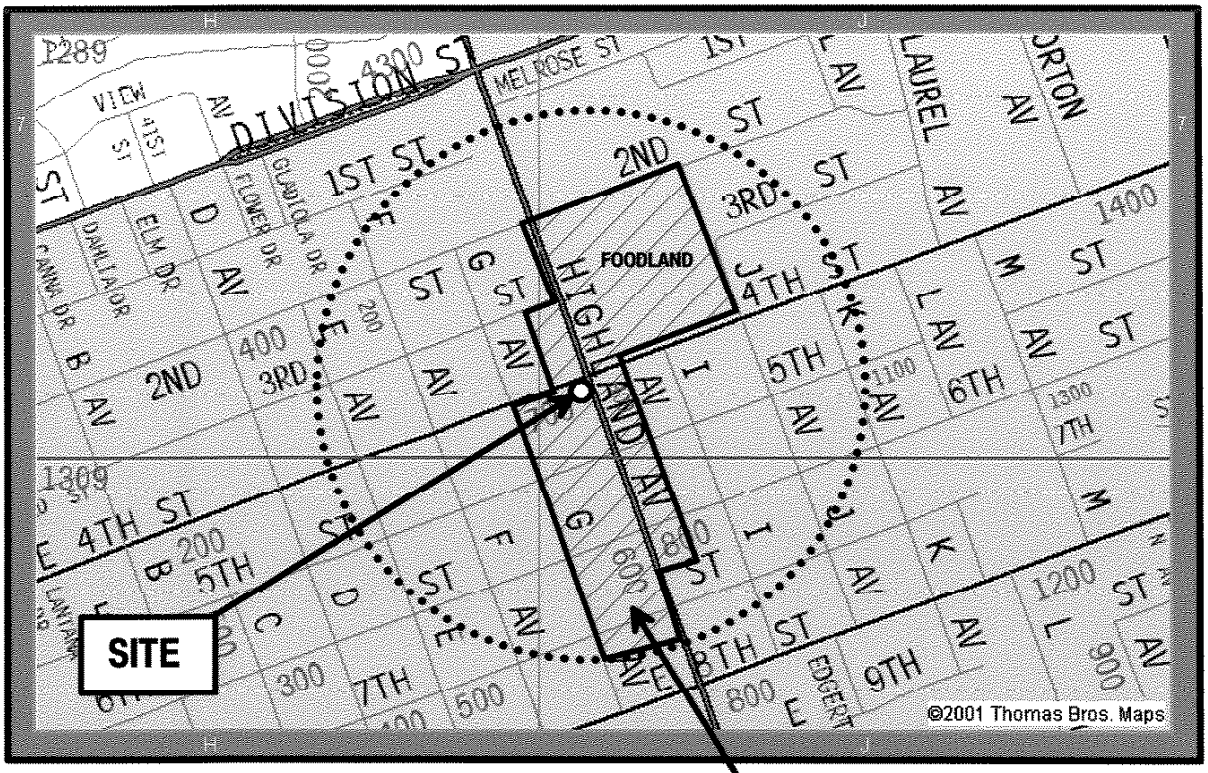


FIGURE 6 - ESTIMATED EXTENT OF IMPACTED GROUNDWATER JUNE 2005

SMOG CENTRO
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA

COMPLIANCE MONITORING SERVICES



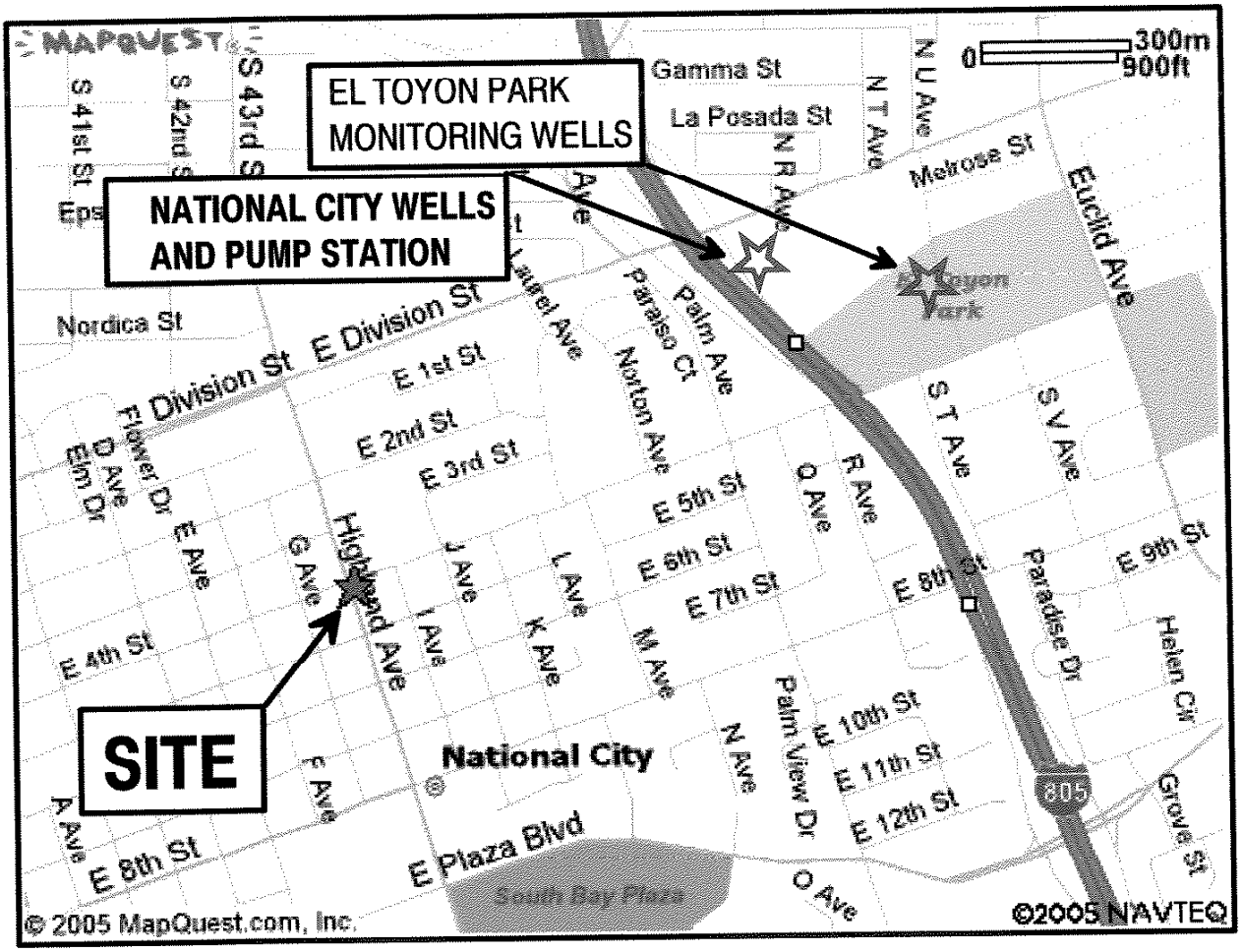
COMMERCIAL LAND USE (RETAIL SHOPS AND SERVICES) WITH MIXED RESIDENTIAL LOTS IN HATCHERED AREA; OTHERWISE RESIDENTIAL USE WITHIN THE 1000-FOOT RADIUS SHOWN

NORTH

NO SCALE

FIGURE 7 -
VICINITY MAP FOR SENSITIVE RECEPTOR SURVEY

SMOG CENTRO
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA



NORTH

FIGURE 8 -
SITE LOCATION MAP AND MUNICIPAL WELL FIELD

HIGHLAND TIRE AND SERVICE
404 HIGHLAND AVENUE
NATIONAL CITY, CALIFORNIA

APPENDIX A

FIELD AND LABORATORY PROCEDURES

APPENDIX A

FIELD AND LABORATORY PROCEDURES

The soil and groundwater investigation was performed in accordance with DEH approved workplan documents. The field and laboratory methods used by CMS are consistent with the guidelines presented in the Site Assessment and Mitigation (SAM) Manual at the time of the investigation (2003-05). This appendix was prepared in support of the Corrective Action Plan (CAP) prepared in September 2005. Previous correspondence and documents filed with DEH are referenced, such as the *Site Assessment Report* (CMS, 2003), and the text also describes tables, figures and appendices that are included within the CAP document.

A.1 Field Methods

CMS relied on UST removal and sampling information provided by others and also collected independent observations/data during these field activities as the basis for assessing the impact of petroleum fuels to the subsurface.

A.1.1 Excavation and Soil Sampling

Soil samples were collected by others at the direction of the DEH when the tanks and pipelines were removed. Soil samples were collected from the floor of the UST pits and beneath pipelines and dispensers as shown on Figure 2. Additional information on the UST removal and sampling activities are provided in *Site Assessment Report* (CMS, 2003).

A.1.2 Drilling and Soil Sampling

Drilling and well construction services were provided by State-licensed Drillers. West Hazmat Drilling Corporation (soil boring B-1) and Tri County Drilling Corporation (monitoring wells MW-2, MW-3 and MW-4) utilized CME-75 truck-mounted drilling rigs to turn 8-inch outside diameter, continuous flight, hollow-stem augers. Soil samples were collected by drive sampling with a split-spoon sampler lowered through the hollow-stem augers at generally 5-foot intervals. The split-spoon sampler lined with metal tubes was generally driven 18-inches or until refusal using repetitive blows with a 140-pound hammer. A relatively undisturbed soil core from each interval was retained in the liner tube, sealed with Teflon™ -lined plastic caps, labeled, and stored in an iced cooler until delivery to the analytical laboratory. Sample portions were extruded from the remaining tubes for visual soil classification and field screening of organic vapors with an electronic detector. Soil samples were classified in general accordance with "Standard Practice for Description and Identification of Soils" (ASTM D2488-90). Soil boring logs were prepared during drilling to record soil sampling efforts, lithologic descriptions, vapor measurements, and other observations. The logs are provided in *Site Assessment Report* (CMS, 2003).

Soil borings and groundwater monitoring wells were drilled as authorized in Well Permit #W99813 (B-1 in 2001) and #W101294 (2003) issued by the DEH Land and Water Quality Division. All soil borings were abandoned with bentonite clay or used to construct groundwater monitoring wells in accordance with DWR Bulletin 74-90 and the County Well Permit as recorded on the boring logs in *Site Assessment Report*. Soil cuttings and other drilling wastes were handled as described in Section A.3.

A.1.3 Monitoring Well Construction and Development

Schedule 40, polyvinyl chloride (PVC) casing and screen were used with appropriate filter sand and sealing materials to construct the wells as the hollow-stem augers were withdrawn from the boreholes. Each well was repetitively swabbed with a surge block to settle and stabilize the filter sand prior to placing the sealing materials. The wells were completed at grade with flush-mounted, traffic-rated covers surrounded by concrete to at least 3 feet bgs. Construction diagrams for the three groundwater monitoring wells are shown on the boring logs in *Site Assessment Report*.

Subsequent to construction, each well was further developed by repetitive surging and purging with a mechanized bailer system until accumulated silt had been removed to the bottom of each casing. Well development efforts were recorded on the logs provided in *Site Assessment Report*.

The top-of-casing elevation for each well was determined with +/- 0.01 foot accuracy using an auto level and survey rod relative to an arbitrary benchmark. Table 2 lists the top-of-casing elevations used during subsequent well measurements and groundwater elevation calculations.

A.1.4 Groundwater Monitoring

Groundwater monitoring of the wells consisted of periodic depth measurements/ free-product inspections and well sampling events during the investigation. Depth-to-water measurements and free-product inspections were made using a decontaminated electronic water-level meter and color-indicator paste. Table 2 is a summary of field measurements and sample analytical results over time. Prior to sampling, groundwater was purged until the well was dry repeatedly and/or until successive field measurements of pH, temperature, and conductivity were observed to stabilize. Well purging was most-often accomplished with a mechanized bailer system, though a pneumatic submersible pump was used in June 2005.

Groundwater samples were retrieved using a disposable polyethylene bailer, transferred into appropriate containers, labeled with origin and date, and stored in an iced cooler until delivery to the analytical laboratory. Details of the groundwater monitoring activities were recorded on Groundwater Monitoring Well Data Sheets and Sample Collection Logs provided in *Site Assessment Report, Results of Continued Site Investigation* (CMS, 2004) and *Groundwater Monitoring Update Report* (CMS, 2005). The logs documenting the June 2005

sampling, transportation, and storage efforts are included in Appendix B.

A.1.5 Equipment Decontamination

Standard field decontamination procedures were applied during all stages of work. The hollow-stem augers were steam cleaned prior to use and between borings. Between sample intervals, the drive sampler was disassembled and scrubbed with a soapy water solution, rinsed with tap water, and re-lined with clean and dry metal tubes. The well materials were supplied new and appropriately washed and wrapped. Downhole groundwater equipment was routinely decontaminated with a soapy water scrub and a tap water rinse between wells.

A.1.6 Soil Vapor Survey

H&P's Standard Operating Procedures for Vapor Sample Collection and Mobile Laboratory Analysis, including laboratory procedures for initial calibration, sample analysis, and related quality assurance/quality control are provided in *Site Assessment Report*.

CMS utilized the DEH's 2005 Vapor Risk Assessment Model spreadsheet to reduce the soil vapor survey data and calculate the human health risk as presented in Appendix C.

A.2 Laboratory Methods and Results

Soil and groundwater samples were submitted to State-certified environmental laboratories and subjected to the testing program described in the workplan documents. The samples were selectively analyzed by the following laboratory methods:

- Total Petroleum Hydrocarbons by EPA Method 8015M, the CA DHS Method for gasoline (TPH-g) and for diesel (TPH-d),
- benzene, toluene, ethylbenzene, total xylenes (BTEX) and naphthalene by EPA Method 8260B, and
- methyl-tert butyl ether (MTBE), di-isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE), and tertiary butyl alcohol (TBA) by EPA Method 8260B.

The results for soil and groundwater samples collected during the various stages of investigation are listed on Tables 1 and 2. The recent laboratory report, which includes sample results, QA/QC documentation, and chain-of-custody record, are provided in Appendix B.

A.3 Management of Wastes

Non-regulated and uncontaminated waste products generated during soil and groundwater investigation activities were handled and disposed as municipal waste. Soil cuttings from the drilling investigation were placed in 55-gallon capacity steel drums. Purged groundwater was temporarily stored in either steel drums or a polyethylene tank.

CMS labeled each of these containers to indicate the contents, date of accumulation, site location, and contact information, and they were stored at the site until proper disposal arrangements could be made.

The soil cuttings and decontamination wastes from each of the two drilling stages were transported by Asbury Environmental Services for consolidation and disposal by D/K Environmental. Purged groundwater was repeatedly stored in drums or a polyethylene tank, labeled, and then later scheduled for batch discharges to the sanitary sewer according to authorizations issued by City of San Diego Metropolitan Wastewater Dept. and City of National City (see typical permit in Appendix B).

APPENDIX B

RECENT FIELD LOGS,

LABORATORY REPORT AND

WASTE DISPOSAL DOCUMENTS

GROUNDWATER MONITORING WELL DATA SHEET
Address: 404 Highland Avenue, National City, CA
Date: 6/7/05

Construction Data			Field Data			Elevations	
WELL ID	TD	SI	DTW	FP? (Y/N)	FPT	TOC	GW
MW-4	78.9	63.5-78.5	66.05	N		On file	
MW-2	74.9	59.5→74.5	66.28	N			
MW-3	79.4	59.0→79	66.62	N			

Explanation:

TD	Total depth of well below ground surface (in feet)
SI	Screened interval depth below ground surface (in feet)
DTW	Depth to water from top of casing measured with an electronic sounder (in feet)
FP?	Free product layer detected in well? (Yes/No)
FPT	Free product thickness measured with electronic interface probe (in feet)
TOC	Top of casing reference elevation +/- 0.01 feet relative to other wells (in feet)
GW	Calculated groundwater elevation relative to other wells (in feet)

Signature: Chris Williams

Date 6/7/05

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: SMOG Centro
Project No. 20512
Chain-of-Custody No.:

Well ID (attach map if necessary): MW-4
Sample Identification: MW4-0605
Sample Collected by: C. Williams
Checked by (Office)/Date: [illegible] 6/11/05

EQUIPMENT*

Water Level Meter ID #: Solinst - CMS #1
Purging Method/Equipment: pneumatic pump / disposable bailer
pH/Cond. Meter ID #/Serial #: Hydac - CMS #1
Sampling Method : Disposable Bailer + Cord
Decontamination Methods: Alconox/water solution to clean, tap water rinse x2

WELL SPECIFICATIONS*

Borehole Diameter : 8 inches
Casing Inside Diameter : 2 inches
TOC Elevation : On file feet

MEASUREMENTS*

Depth to Water (DW) : 66.05 feet (Static Water Level)
Total Well Depth : 78.9 feet
Floating Product? : N (Y/N)
Product Thickness : — inches/ft?

PURGING REQUIREMENT ESTIMATION*

Use well specifications to obtain estimated borehole volume (BV) from table on back of this form.

12.8' BV = 10 gallons *(Assumes 25% porosity in filter pack.)*

PURGING AND SAMPLING INFORMATION*

Slow Recharging Well < 80 % recovery in 2 hours < Fast Recharging Well

1. Purge 1 BV, record measurements below
2. Allow 2 hours for recovery, note depth
3. Collect samples

Note: This well is assumed to be a f (slow (fast) recharging well.

1. Purge 1 BV, take measurements and record below.
2. Purge an additional 1/2 BV and record measurements below. If measurements stabilized then go to Step 3. If not, continue purging 1/2 BVs and taking measurement until 3 BVs are removed or measurements stabilize. Calculate maximum drawdown.
3. Allow 80% recovery (PR), note depth.
4. Collect samples.

Time	Depth to Water (feet)	Volume Purged (gallons)	Temp. (°F)	Specific Conductance (µS/cm)	pH	Water Description (Color, Turbidity, Odor, Oil)
1107	66.03	0	—	—	—	beg. purging
1130	66.7	10	74.4	4,900	6.7	DB sample @ 10
1144	66.7	15	72.9	4,800	6.8	" "
1158	66.6	20	72.9	4,700	6.7	" "

Total Volume Purged: 20 gallons Greatest Depth (GD) 66.7 ft (During Purging) Depth to Water 66.1 ft (At time of Sampling)

PERCENT RECOVERY CALCULATIONS

where: PR = Percent recovery
RD = Residual drawdown; the difference between the measured depth to water prior to purging and the measured depth to water at the time of sampling.
MD = Maximum drawdown; the difference between the static water level (DW) prior to purging and the greatest depth during purging (GD).

$$PR = (1 - \frac{RD}{MD}) \times 100 = (1 - \frac{0.1}{0.7}) \times 100\% = 86\%$$

Note: Depth to water (at time of sampling) should be: GD - 80% recovery value (See table on back for 80% recovery value for calculated maximum drawdown).

SAMPLE PACKAGING*

Container Type(s) and Volume	Filtered (Y/N)	Sample Preservatives	Time Sample Collected	Analytical Parameters
3 x 40 ml VOA	N	HCl, chilled	1207	TPH(g), VOCs incl oxys

* SEE BACK FOR DETAILED INSTRUCTIONS

COLLECTOR'S SIGNATURE : [signature] Date: 6/7/05

Date 6/7/05

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: SMOG Centre
Project No. 20512
Chain-of-Custody No.: —

Well ID (attach map if necessary): MW-2
Sample Identification: MW2-0605
Sample Collected by: C. Williams
Checked by (Office)/Date: DW 6/11/05

EQUIPMENT*

Water Level Meter ID #: Solinst - CHM #1
Purging Method/Equipment: peristaltic pump / disposable tubing
pH/Cond. Meter ID #/Serial #: Hydac - CHM #1
Sampling Method : Disposable Bailer + Cord
Decontamination Methods: Alconox/water solution to clean, tap water rinse x2

WELL SPECIFICATIONS*

Borehole Diameter : 8 inches
Casing Inside Diameter : 2 inches
TOC Elevation : on file feet

MEASUREMENTS*

Depth to Water (DW) : 66.28 feet (Static Water Level)
Total Well Depth : 74.9 feet
Floating Product? : N (Y/N)
Product Thickness : — inches/ft?

PURGING REQUIREMENT ESTIMATION*

Use well specifications to obtain estimated borehole volume (BV) from table on back of this form.

8.6' BV = 6.7 gallons *(Assumes 25% porosity in filter pack.)*

PURGING AND SAMPLING INFORMATION*

Slow Recharging Well < 80 % recovery in 2 hours < Fast Recharging Well

1. Purge 1 BV, record measurements below
2. Allow 2 hours for recovery, note depth
3. Collect samples

Note: This well is assumed to be a f (slow/fast) recharging well.

1. Purge 1 BV, take measurements and record below.
2. Purge an additional 1/2 BV and record measurements below. If measurements stabilized then go to Step 3. If not, continue purging 1/2 BVs and taking measurement until 3 BVs are removed or measurements stabilize. Calculate maximum drawdown.
3. Allow 80% recovery (PR), note depth.
4. Collect samples.

Time	Depth to Water (feet)	Volume Purged (gallons)	Temp. (°F)	Specific Conductance (µS/cm)	pH	Water Description (Color, Turbidity, Odor, Oil)
1306	66.27	0	—	—	—	begin purging
1334	66.7	7	75.5	4,900	7.1	clear, no odor
1346	66.7	10	74.1	4,900	7.1	" "
1359	66.7	13.5	73.9	4,900	7.0	" "

Total Volume Purged: 13.5 gallons Greatest Depth (GD) 66.7 ft (During Purging) Depth to Water 66.35 ft (At time of Sampling)

PERCENT RECOVERY CALCULATIONS

where: PR = Percent recovery
RD = Residual drawdown; the difference between the measured depth to water prior to purging and the measured depth to water at the time of sampling.
MD = Maximum drawdown; the difference between the static water level (DW) prior to purging and the greatest depth during purging (GD).

$$PR = (1 - \frac{RD}{MD}) \times 100 = (1 - \frac{0.07}{0.4}) \times 100\% = 83\%$$

Note: Depth to water (at time of sampling) should be: GD - 80% recovery value (See table on back for 80% recovery value for calculated maximum drawdown).

SAMPLE PACKAGING*

Container Type(s) and Volume	Filtered (Y/N)	Sample Preservatives	Time Sample Collected	Analytical Parameters
3 x 40 ml VOA	N	HCl, chilled	1404	TPH(g), VOCs inc Oxys

* SEE BACK FOR DETAILED INSTRUCTIONS

COLLECTOR'S SIGNATURE : C. Williams Date: 6/7/05

Date 6/7/05

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: SMOG Centro
Project No. 20512
Chain-of-Custody No.: –

Well ID (attach map if necessary): MW-3
Sample Identification: MW3-0605
Sample Collected by: C. Williams
Checked by (Office)/Date: AW 6/11/05

EQUIPMENT*

Water Level Meter ID #: Solinst – CMS #1
Purging Method/Equipment: pneumatic pump/disposable bailer
pH/Cond. Meter ID #/Serial #: Hydac – CMS #1
Sampling Method : Disposable Bailer + Cord
Decontamination Methods: Alconox/water solution & clean, tap water rinse x2

WELL SPECIFICATIONS*

Borehole Diameter : 8 inches
Casing Inside Diameter : 2 inches
TOC Elevation : on file feet

MEASUREMENTS*

Depth to Water (DW) : 66.62 feet (Static Water Level)
Total Well Depth : 79.4 feet
Floating Product? : N (Y/N)
Product Thickness : – inches/ft?

PURGING REQUIREMENT ESTIMATION*

Use well specifications to obtain estimated borehole volume (BV) from table on back of this form.

12.8' BV = 10 gallons *(Assumes 25% porosity in filter pack.)*

PURGING AND SAMPLING INFORMATION*

Slow Recharging Well < 80 % recovery in 2 hours < Fast Recharging Well

1. Purge 1 BV, record measurements below
2. Allow 2 hours for recovery, note depth
3. Collect samples

Note: This well is assumed to be a slow (fast) recharging well.

1. Purge 1 BV, take measurements and record below.
2. Purge an additional 1/2 BV and record measurements below. If measurements stabilized then go to Step 3. If not, continue purging 1/2 BVs and taking measurement until 3 BVs are removed or measurements stabilize. Calculate maximum drawdown.
3. Allow 80% recovery (PR), note depth.
4. Collect samples.

Time	Depth to Water (feet)	Volume Purged (gallons)	Temp. (°F)	Specific Conductance (µS/cm)	pH	Water Description (Color, Turbidity, Odor, Oil)
1427	66.61	0	–	–	–	begin purging
1457	67.25	10	76.0	4,600	6.9	clear, " 0-10
1515	67.2	15	75.7	4,600	6.9	" "
1533	67.1	20	75.7	4,600	6.9	" "

Total Volume Purged: 20 gallons Greatest Depth (GD) 67.25 ft (During Purging) Depth to Water 66.7 ft (At time of Sampling)

PERCENT RECOVERY CALCULATIONS

where: PR = Percent recovery
RD = Residual drawdown; the difference between the measured depth to water prior to purging and the measured depth to water at the time of sampling.
MD = Maximum drawdown; the difference between the static water level (DW) prior to purging and the greatest depth during purging (GD).

$$PR = (1 - \frac{RD}{MD}) \times 100 = (1 - \frac{0.09}{0.64}) \times 100\% = 86\%$$

Note: Depth to water (at time of sampling) should be: GD - 80% recovery value (See table on back for 80% recovery value for calculated maximum drawdown).

SAMPLE PACKAGING*

Container Type(s) and Volume	Filtered (Y/N)	Sample Preservatives	Time Sample Collected	Analytical Parameters
3 x 40 ml VOA	N	HCl, chilled	1538	TPH(G), VOCs inc OMGs

* SEE BACK FOR DETAILED INSTRUCTIONS

COLLECTOR'S SIGNATURE : C. Williams Date: 6/7/05

Del Mar Analytical

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

LABORATORY REPORT

Prepared For: Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project: Smog Centro
20512

Sampled: 06/07/05
Received: 06/08/05
Issued: 06/20/05 16:45

NELAP #01108CA California ELAP#1197 CSDLAC #10117

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of Del Mar Analytical and its client. This report shall not be reproduced, except in full, without written permission from Del Mar Analytical. The Chain of Custody, 1 page, is included and is an integral part of this report.

This entire report was reviewed and approved for release.

SAMPLE CROSS REFERENCE

LABORATORY ID	CLIENT ID	MATRIX
IOF0703-01	MW4-0605	Water
IOF0703-02	MW2-0605	Water
IOF0703-03	MW3-0605	Water
IOF0703-04	WW-0605	Water

Reviewed By:

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave , Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

VOLATILE FUEL HYDROCARBONS BY GC/MS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IOF0703-01 (MW4-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Volatile Fuel Hydrocarbons (C4-C12)	TPH by GC/MS	5F11015	500	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*114 %*				
Surrogate: Toluene-d8 (80-120%)				*105 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*104 %*				
Sample ID: IOF0703-02 (MW2-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Volatile Fuel Hydrocarbons (C4-C12)	TPH by GC/MS	5F11015	500	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*114 %*				
Surrogate: Toluene-d8 (80-120%)				*104 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*107 %*				
Sample ID: IOF0703-03 (MW3-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Volatile Fuel Hydrocarbons (C4-C12)	TPH by GC/MS	5F12005	1000	**1900**	2	6/12/2005	6/12/2005	
Surrogate: Dibromofluoromethane (80-120%)				*113 %*				
Surrogate: Toluene-d8 (80-120%)				*108 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*106 %*				
Sample ID: IOF0703-04 (WW-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Volatile Fuel Hydrocarbons (C4-C12)	TPH by GC/MS	5F11015	500	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*111 %*				
Surrogate: Toluene-d8 (80-120%)				*105 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*104 %*				

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

BTEX/OXYGENATES by GC/MS (EPA 8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IOF0703-01 (MW4-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Benzene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
Ethylbenzene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
Toluene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
o-Xylene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
m,p-Xylenes	EPA 8260B	5F11015	1.0	ND	1	6/11/2005	6/11/2005	
Xylenes, Total	EPA 8260B	5F11015	1.5	ND	1	6/11/2005	6/11/2005	
Di-isopropyl Ether (DIPE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Ethyl tert-Butyl Ether (ETBE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
tert-Amyl Methyl Ether (TAME)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	5F11015	1.0	ND	1	6/11/2005	6/11/2005	
tert-Butanol (TBA)	EPA 8260B	5F11015	50	ND	1	6/11/2005	6/11/2005	
Ethanol	EPA 8260B	5F11015	150	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*114 %*				
Surrogate: Toluene-d8 (80-120%)				*105 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*104 %*				
Sample ID: IOF0703-02 (MW2-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Benzene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
Ethylbenzene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
Toluene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
o-Xylene	EPA 8260B	5F11015	0.50	ND	1	6/11/2005	6/11/2005	
m,p-Xylenes	EPA 8260B	5F11015	1.0	ND	1	6/11/2005	6/11/2005	
Xylenes, Total	EPA 8260B	5F11015	1.5	ND	1	6/11/2005	6/11/2005	
Di-isopropyl Ether (DIPE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Ethyl tert-Butyl Ether (ETBE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
tert-Amyl Methyl Ether (TAME)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	5F11015	1.0	ND	1	6/11/2005	6/11/2005	
tert-Butanol (TBA)	EPA 8260B	5F11015	50	ND	1	6/11/2005	6/11/2005	
Ethanol	EPA 8260B	5F11015	150	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*114 %*				
Surrogate: Toluene-d8 (80-120%)				*104 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*107 %*				

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

Del Mar Analytical

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

BTEX/OXYGENATES by GC/MS (EPA 8260B)

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IOF0703-03 (MW3-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Benzene	EPA 8260B	5F11015	0.50	**170**	1	6/11/2005	6/11/2005	
Ethylbenzene	EPA 8260B	5F11015	0.50	**67**	1	6/11/2005	6/11/2005	
Toluene	EPA 8260B	5F11015	0.50	**180**	1	6/11/2005	6/11/2005	
o-Xylene	EPA 8260B	5F11015	0.50	**120**	1	6/11/2005	6/11/2005	
m,p-Xylenes	EPA 8260B	5F11015	1.0	**230**	1	6/11/2005	6/11/2005	
Xylenes, Total	EPA 8260B	5F11015	1.5	**360**	1	6/11/2005	6/11/2005	
Di-isopropyl Ether (DIPE)	EPA 8260B	5F11015	5.0	**9.6**	1	6/11/2005	6/11/2005	
Ethyl tert-Butyl Ether (ETBE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
tert-Amyl Methyl Ether (TAME)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	5F11015	1.0	**2.3**	1	6/11/2005	6/11/2005	
tert-Butanol (TBA)	EPA 8260B	5F11015	50	ND	1	6/11/2005	6/11/2005	
Ethanol	EPA 8260B	5F11015	150	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*114 %*				
Surrogate: Toluene-d8 (80-120%)				*108 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*104 %*				
Sample ID: IOF0703-04 (WW-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: ug/l								
Benzene	EPA 8260B	5F11015	0.50	**5.8**	1	6/11/2005	6/11/2005	
Ethylbenzene	EPA 8260B	5F11015	0.50	**1.1**	1	6/11/2005	6/11/2005	
Toluene	EPA 8260B	5F11015	0.50	**6.1**	1	6/11/2005	6/11/2005	
o-Xylene	EPA 8260B	5F11015	0.50	**2.6**	1	6/11/2005	6/11/2005	
m,p-Xylenes	EPA 8260B	5F11015	1.0	**4.9**	1	6/11/2005	6/11/2005	
Xylenes, Total	EPA 8260B	5F11015	1.5	**7.5**	1	6/11/2005	6/11/2005	
Di-isopropyl Ether (DIPE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Ethyl tert-Butyl Ether (ETBE)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
tert-Amyl Methyl Ether (TAME)	EPA 8260B	5F11015	5.0	ND	1	6/11/2005	6/11/2005	
Methyl-tert-butyl Ether (MTBE)	EPA 8260B	5F11015	1.0	ND	1	6/11/2005	6/11/2005	
tert-Butanol (TBA)	EPA 8260B	5F11015	50	ND	1	6/11/2005	6/11/2005	
Ethanol	EPA 8260B	5F11015	150	ND	1	6/11/2005	6/11/2005	
Surrogate: Dibromofluoromethane (80-120%)				*111 %*				
Surrogate: Toluene-d8 (80-120%)				*105 %*				
Surrogate: 4-Bromofluorobenzene (80-120%)				*104 %*				

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METALS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IOF0703-04 (WW-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: mg/l								
Lead	EPA 6010B	5F10073	0.0050	ND	1	6/10/2005	6/11/2005	

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro 20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

INORGANICS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: IOF0703-04 (WW-0605 - Water)				**Sampled: 06/07/05**				
Reporting Units: °C								
Flashpoint	EPA 1010	5F09077	20	**94**	1	6/9/2005	6/9/2005	

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

VOLATILE FUEL HYDROCARBONS BY GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F11015 Extracted: 06/11/05										
Blank Analyzed: 06/11/2005 (5F11015-BLK1)										
Volatile Fuel Hydrocarbons (C4-C12)	ND	500	ug/l							
Surrogate: Dibromofluoromethane	*27.6*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.3*		*ug/l*	*25.0*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.6*		*ug/l*	*25.0*		*102*	*80-120*			
LCS Analyzed: 06/11/2005 (5F11015-BS1)										
Surrogate: Dibromofluoromethane	*27.5*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.3*		*ug/l*	*25.0*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.2*		*ug/l*	*25.0*		*105*	*80-120*			
LCS Analyzed: 06/11/2005 (5F11015-BS2)										
Volatile Fuel Hydrocarbons (C4-C12)	465	500	ug/l	500		93	60-130			
Surrogate: Dibromofluoromethane	*28.2*		*ug/l*	*25.0*		*113*	*80-120*			
Surrogate: Toluene-d8	*26.4*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.6*		*ug/l*	*25.0*		*102*	*80-120*			
Matrix Spike Analyzed: 06/11/2005 (5F11015-MS1)					**Source: IOF0432-16**					
Volatile Fuel Hydrocarbons (C4-C12)	1420	500	ug/l	1120	26	124	60-140			
Surrogate: Dibromofluoromethane	*27.3*		*ug/l*	*25.0*		*109*	*80-120*			
Surrogate: Toluene-d8	*26.6*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.9*		*ug/l*	*25.0*		*104*	*80-120*			
Matrix Spike Dup Analyzed: 06/11/2005 (5F11015-MSD1)					**Source: IOF0432-16**					
Volatile Fuel Hydrocarbons (C4-C12)	1460	500	ug/l	1120	26	128	60-140	3	20	
Surrogate: Dibromofluoromethane	*27.5*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.1*		*ug/l*	*25.0*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.9*		*ug/l*	*25.0*		*104*	*80-120*			

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

Del Mar Analytical

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

VOLATILE FUEL HYDROCARBONS BY GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F12005 Extracted: 06/12/05										
Blank Analyzed: 06/12/2005 (5F12005-BLK1)										
Volatile Fuel Hydrocarbons (C4-C12)	ND	500	ug/l							
Surrogate: Dibromofluoromethane	*28.7*		*ug/l*	*25.0*		*115*	*80-120*			
Surrogate: Toluene-d8	*26.6*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.6*		*ug/l*	*25.0*		*106*	*80-120*			
LCS Analyzed: 06/12/2005 (5F12005-BS2)										
Volatile Fuel Hydrocarbons (C4-C12)	505	500	ug/l	500		101	60-130			
Surrogate: Dibromofluoromethane	*28.0*		*ug/l*	*25.0*		*112*	*80-120*			
Surrogate: Toluene-d8	*26.2*		*ug/l*	*25.0*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.3*		*ug/l*	*25.0*		*105*	*80-120*			
Matrix Spike Analyzed: 06/12/2005 (5F12005-MS1)					**Source: IOF0727-01**					
Volatile Fuel Hydrocarbons (C4-C12)	1520	500	ug/l	1120	57	131	60-140			
Surrogate: Dibromofluoromethane	*27.6*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.4*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.2*		*ug/l*	*25.0*		*105*	*80-120*			
Matrix Spike Dup Analyzed: 06/12/2005 (5F12005-MSD1)					**Source: IOF0727-01**					
Volatile Fuel Hydrocarbons (C4-C12)	1520	500	ug/l	1120	57	131	60-140	0	20	
Surrogate: Dibromofluoromethane	*27.6*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.5*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.4*		*ug/l*	*25.0*		*106*	*80-120*			

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

BTEX/OXYGENATES by GC/MS (EPA 8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F11015 Extracted: 06/11/05										
Blank Analyzed: 06/11/2005 (5F11015-BLK1)										
Benzene	ND	0.50	ug/l							
Ethylbenzene	ND	0.50	ug/l							
Toluene	ND	0.50	ug/l							
o-Xylene	ND	0.50	ug/l							
m,p-Xylenes	ND	1.0	ug/l							
Xylenes, Total	ND	1.5	ug/l							
Di-isopropyl Ether (DIPE)	ND	5.0	ug/l							
Ethyl tert-Butyl Ether (ETBE)	ND	5.0	ug/l							
tert-Amyl Methyl Ether (TAME)	ND	5.0	ug/l							
Methyl-tert-butyl Ether (MTBE)	ND	1.0	ug/l							
tert-Butanol (TBA)	ND	50	ug/l							
Ethanol	ND	150	ug/l							
Surrogate: Dibromofluoromethane	*27.6*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.3*		*ug/l*	*25.0*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.6*		*ug/l*	*25.0*		*102*	*80-120*			
LCS Analyzed: 06/11/2005 (5F11015-BS1)										
Benzene	21.1	0.50	ug/l	25.0		84	65-120			
Ethylbenzene	23.1	0.50	ug/l	25.0		92	70-125			
Toluene	23.3	0.50	ug/l	25.0		93	70-125			
o-Xylene	23.3	0.50	ug/l	25.0		93	70-125			
m,p-Xylenes	46.5	1.0	ug/l	50.0		93	70-125			
Xylenes, Total	69.8	1.5	ug/l	75.0		93	70-125			
Di-isopropyl Ether (DIPE)	22.6	5.0	ug/l	25.0		90	60-135			
Ethyl tert-Butyl Ether (ETBE)	23.2	5.0	ug/l	25.0		93	60-135			
tert-Amyl Methyl Ether (TAME)	24.0	5.0	ug/l	25.0		96	60-135			
Methyl-tert-butyl Ether (MTBE)	23.8	1.0	ug/l	25.0		95	55-140			
tert-Butanol (TBA)	143	50	ug/l	125		114	65-135			
Ethanol	216	150	ug/l	250		86	35-160			
Surrogate: Dibromofluoromethane	*27.5*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.3*		*ug/l*	*25.0*		*105*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*26.2*		*ug/l*	*25.0*		*105*	*80-120*			

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

BTEX/OXYGENATES by GC/MS (EPA 8260B)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F11015 Extracted: 06/11/05										
Matrix Spike Analyzed: 06/11/2005 (5F11015-MS1)					**Source: IOF0432-16**					
Benzene	23.5	0.50	ug/l	25.0	ND	94	60-125			
Ethylbenzene	25.3	0.50	ug/l	25.0	ND	101	65-130			
Toluene	26.0	0.50	ug/l	25.0	ND	104	65-125			
o-Xylene	25.9	0.50	ug/l	25.0	ND	104	60-125			
m,p-Xylenes	51.5	1.0	ug/l	50.0	ND	103	60-130			
Xylenes, Total	77.4	1.5	ug/l	75.0	ND	103	60-130			
Di-isopropyl Ether (DIPE)	24.1	5.0	ug/l	25.0	ND	96	60-140			
Ethyl tert-Butyl Ether (ETBE)	22.8	5.0	ug/l	25.0	ND	91	55-135			
tert-Amyl Methyl Ether (TAME)	22.6	5.0	ug/l	25.0	ND	90	55-140			
Methyl-tert-butyl Ether (MTBE)	21.6	1.0	ug/l	25.0	ND	86	50-150			
tert-Butanol (TBA)	148	50	ug/l	125	ND	118	60-145			
Ethanol	240	150	ug/l	250	ND	96	35-160			
Surrogate: Dibromofluoromethane	*27.3*		*ug/l*	*25.0*		*109*	*80-120*			
Surrogate: Toluene-d8	*26.6*		*ug/l*	*25.0*		*106*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.9*		*ug/l*	*25.0*		*104*	*80-120*			
Matrix Spike Dup Analyzed: 06/11/2005 (5F11015-MSD1)					**Source: IOF0432-16**					
Benzene	24.2	0.50	ug/l	25.0	ND	97	60-125	3	20	
Ethylbenzene	26.0	0.50	ug/l	25.0	ND	104	65-130	3	20	
Toluene	26.4	0.50	ug/l	25.0	ND	106	65-125	2	20	
o-Xylene	26.0	0.50	ug/l	25.0	ND	104	60-125	0	20	
m,p-Xylenes	50.9	1.0	ug/l	50.0	ND	102	60-130	1	25	
Xylenes, Total	76.9	1.5	ug/l	75.0	ND	103	60-130	1	20	
Di-isopropyl Ether (DIPE)	26.0	5.0	ug/l	25.0	ND	104	60-140	8	25	
Ethyl tert-Butyl Ether (ETBE)	25.5	5.0	ug/l	25.0	ND	102	55-135	11	25	
tert-Amyl Methyl Ether (TAME)	25.9	5.0	ug/l	25.0	ND	104	55-140	14	30	
Methyl-tert-butyl Ether (MTBE)	25.1	1.0	ug/l	25.0	ND	100	50-150	15	25	
tert-Butanol (TBA)	138	50	ug/l	125	ND	110	60-145	7	25	
Ethanol	257	150	ug/l	250	ND	103	35-160	7	30	
Surrogate: Dibromofluoromethane	*27.5*		*ug/l*	*25.0*		*110*	*80-120*			
Surrogate: Toluene-d8	*26.1*		*ug/l*	*25.0*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*25.9*		*ug/l*	*25.0*		*104*	*80-120*			

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F10073 Extracted: 06/10/05										
Blank Analyzed: 06/11/2005 (5F10073-BLK1)										
Lead	ND	0.0050	mg/l							
LCS Analyzed: 06/11/2005 (5F10073-BS1)										
Lead	0.977	0.0050	mg/l	1.00		98	80-120			
Matrix Spike Analyzed: 06/11/2005 (5F10073-MS1)					**Source: IOF0618-01**					
Lead	0.965	0.0050	mg/l	1.00	ND	96	75-125			
Matrix Spike Dup Analyzed: 06/11/2005 (5F10073-MSD1)					**Source: IOF0618-01**					
Lead	0.958	0.0050	mg/l	1.00	ND	96	75-125	1	20	

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

Del Mar Analytical

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 5F09077 Extracted: 06/09/05										
Duplicate Analyzed: 06/09/2005 (5F09077-DUP1)					**Source: IOF0589-04**					
Flashpoint	55.0	20	°C		56			2	20	
Reference Analyzed: 06/09/2005 (5F09077-SRM1)										
Flashpoint	26.0	20	°C	27.0		96	96-104			

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

Del Mar Analytical

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

DATA QUALIFIERS AND DEFINITIONS

ND Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.

RPD Relative Percent Difference

ADDITIONAL COMMENTS

For 8260 analyses:

Due to the high water solubility of alcohols and ketones, the calibration criteria for these compounds is <30% RSD.
The average % RSD of all compounds in the calibration is 15%, in accordance with EPA methods.

For Volatile Fuel Hydrocarbons (C4-C12):

Volatile Fuel Hydrocarbons (C4-C12) are quantitated against a gasoline standard. Quantitation begins immediately before TBA-d9.

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

17461 Derian Ave., Suite 100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-8596 FAX (858) 505-9689
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Del Mar Analytical

Compliance Monitoring Services
2338 Frankfort Street
San Diego, CA 92110
Attention: Clint Williams

Project ID: Smog Centro
20512
Report Number: IOF0703

Sampled: 06/07/05
Received: 06/08/05

Certification Summary

Del Mar Analytical, Irvine

Method	Matrix	Nelac	California
EPA 1010	Water	X	X
EPA 6010B	Water	X	X
EPA 8260B	Water	X	X
TPH by GC/MS	Water	X	X

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for Del Mar Analytical may be obtained by contacting the laboratory or visiting our website at www.dmalabs.com.

Del Mar Analytical, Irvine
Jim Hatfield
Project Manager

Del Mar Analytical
2852 Alton Ave., Irvine, CA 92606 (949) 261-1022 FAX (949) 261-1228
1014 E. Cooley Dr., Suite A Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
16525 Sherman Way, Suite C-11, Van Nuys, CA 91406 (818) 779-1844 FAX (818) 779-1843
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (602) 785-0043 FAX (602) 785-0851
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (619) 505-9596 FAX (619) 505-9689
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

IOF 0702364

CHAIN OF CUSTODY FORM

Quote No.: SMOG CONTROL Page: 1 of 1

Client Name: Compliance Monitoring Services	P.O./Project Number: 20512
Address: 2338 Frankfort A.	Project Name: SMOG CONTROL (Formerly Highland Tire & Service)
City: San Diego State: CA Zip: 92110	Project Manager: Clint Williams
Tel: (619) 276-5470 Fax.:	Sampler(s) (signature):

Sample I.D.	Matrix	Date Sampled	Time	Preservation	Number of Containers	Type of Containers	8015 (Gas) 8020 (BTEX) MTBE (8020) 8015/8020/MTBE	8015 (Diesel) fuel fingerprint simulated distillation	Oil & Grease - EPA 413.2	TRPH - EPA 418.1	EPA 8010 EPA 8010/8020	EPA 8270	Title 22 Metals EPA 6010/7000 +Cr VI	EPA 8260 + Oxygenates + MTBE only	Lead	pH	8260 - BTEX/OXY plus TPH (GRO)	Flashpoint (1010)
MW4-0605	Water	6/7/05	1207	HCl Cold	3	VOA											X	
MW2-0605			1404		3												X	
MW 3-0605			1538		3												X	
WW-0605			1515	HNO3 Cold	5	VOA Cap									X		X	X

Relinquished by: Clint Williams	Date/Time: 1741	Received by:	Date/Time: 6/8/05 1225
Relinquished by:	Date/Time: 6/8/05 14:50	Received by:	Date/Time: 6/8/05 14:50
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:

Turnaround Time: (check one)
Same Day ___ 72 hours ___
24 Hours ___ 5 Days ___
48 Hours ___ Standard ✓

Sample Integrity:
Intact: X
Blue On Ice 6°

Remarks:

Note: By relinquishing samples to Del Mar Analytical, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of the invoice. Sample(s) will be disposed of after 30 days.

COC-GT

City of National City
Building & Safety Department
1243 National City Blvd.,
National City, CA 91950-4397
(619) 336-4210

August 23, 2005

Compliance Monitoring Services
Attn: Clint Williams
2338 Frankfort Street
San Diego, CA 92110

Subject: Groundwater Batch Discharge
Facility Location: 404 Highland Ave

Enclosed please find a signed Groundwater Batch Discharge Permit from the City of San Diego Industrial Waste Program subject to stipulated conditions.

Should you have any questions regarding this matter, please contact the Industrial Waste Program office directly at 654-4100.

Sincerely,

Kathleen Trees

Kathleen Trees
Building Director

KT/rg

Enclosure: Groundwater Batch Discharge

CC: Barbara Sharatz, Program Manager
Industrial Waste Program
9192 Topaz Way
San Diego, CA 92123-1119

City of San Diego
Metropolitan Wastewater Department
Request for Authorization to Discharge Extracted Groundwater to Sewer

Return Completed Application to:
Industrial Wastewater Control Program
9192 Topaz Way, MS 901D - San Diego, CA 92123
Ph. (858) 654-4100 – Fax (858) 654-4110

For Metro Use Only:
Facility: _____ Permit: _____
Category: _____ Reviewer: _____
Date Received: _____ Date Reviewed: _____

Project Information

1. Project or Facility Name: SMOG Centro
2. Project Description: Subsurface investigation at former UST site

Applicant Information

3. Applicant Company Name: Compliance Monitoring Services
4. Mailing Address: 2338 Frankfort Street, San Diego, CA 92110
5. Billing Address: same as above
6. Person to contact regarding this application: Clint Williams
   Title: Geologist Phone: 619/276-5470 Fax: 619/276-5442
7. Person to contact for site inspection: same as above
   Title: Phone: Fax:
8. Person to contact to sample at site: same as above
   Title: Phone: Fax:
9. Applicant is: ☐ Property Owner ☒ Consultant ☐ Contractor ☐ Other:

Site Information

10. Street Address: 404 Highland Avenue
    City: National City Zip Code: 91950 Thomas Bros. Coordinates: 1289, J7
11. Describe current activity/business use for property:
    Smog test only facility
12. Describe historic use of property:
    Former retail gasoline and vehicle service station

Discharge Information

13. Proposed Start Date: 8/9/2005 14. Proposed Completion Date: 8/9/2005
15. Max flow rate: 10 gallons/minute 16. Total volume to be discharged: ~75 gals
17. How will discharges above the maximum flow rate be prevented?
    Gravity drain with control valve
18. Circle days of discharge: S M (T) W Th F S 19. Hours of discharge: 0900-1700 hrs
20. Describe proposed discharge point:
    Area drain on south side of building
21. Attach a map showing the location of the discharge point and sewer lateral. Include building walls, streets, alleys, process areas, treatment equipment and all prominent physical features of the site. ✓
22. Attach a schematic of piping, including lengths and O/I diameters, from extraction to discharge point, showing all pumps, flow meters, and any holding tanks and pretreatment equipment. Also attach copies of manufacturer specifications for all pumps, flow meters, and pretreatment equipment. N/A
23. Wastewater will be discharged to:
    ☒ Private sewer connection lateral on site
    ☐ City of San Diego manhole: A signed "hold harmless agreement" is attached.
    ☐ Other Municipality manhole. Agency: _____

Discharges must be made to a private sewer connection whenever possible. Municipal manholes may not be opened without the consent of the municipality. It is the permittee's responsibility to obtain the required consent and to conform to all applicable safety regulations.

Wastewater Information

24. Wastewater source: ☐ Construction dewatering ☐ Remediation ☒ Other: monitoring
25. Pollutants known or suspected to be present in wastewater:
    gasoline
26. Is any liquid hydrocarbon ("free product") present in the groundwater? ☐ Yes ☒ No

Wastewater Information

27. Attach a copy of lab analysis. If you are requesting authorization to discharge gasoline-contaminated wastewater, include an analysis for Total Lead, BTEX or Benzene, TPH or Oil/Grease, and Flashpoint. For other wastewater, contact the Industrial Wastewater Control Program for guidance on initial analysis requirements. ***Samples used for analysis must be representative of the wastewater to be discharged.***

Sample Date: 6/7/2005 Analysis ID: WW-0605 Lab Name: Del Mar Analytical

Describe sample(s) collection procedure: Grab sample from tank

Pretreatment Information

28. Describe all wastewater pretreatment methods and equipment that will be used to prevent the discharge of toxic, flammable, or explosive substances to sewer. Include equipment type, size, design flow rates, and retention times. Attach additional sheets if necessary.
☑ **Check if no pretreatment will be used.**

Note: If construction dewatering, de-silting (solids removal) equipment must be in place to prevent the discharge of sand, soil, or other substances that may obstruct flow or cause blockages in the sewer.

29. If the answer to question #26 is yes, then free product recovery is required, and the pretreatment equipment must be equipped with a feature, such as an automatic sensor with shut-off, that would cease all discharges to sewer in the event of breakthrough (free product release from the recovery device). Describe free product recovery equipment and safety features in place to prevent the discharge of free product to sewer.

not applicable

30. Describe method and frequency of all pretreatment equipment testing and maintenance activities.

not applicable

Other

31. I am requesting: ☐ Permit ☒ Batch Discharge Authorization (see policy)
For batch discharges only: How is groundwater stored? Plastic tank

32. Will discharge fees be billed to the City of San Diego? ☒ No ☐ Yes, a supplemental billing information sheet is attached.

33. Initial here DN to indicate that you have received and read the City's policy for groundwater discharges to sewer. **Policy Revision Date:** May 2004

Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. I further certify that all groundwater discharged to sewer from this project will receive the pretreatment described above. I agree to abide by all regulations governing the disposal of groundwater and agree to comply with the discharge permit or authorization issued. I have read and I agree to abide by the City of San Diego's policy for groundwater discharges to sewer.

Print Name:	Clint Williams	Phone:	(619) 276-5470
Signature:		Date:	8/2/05
Company:	Compliance Monitoring	Title:	Geologist

For City of San Diego Use Only

Batch Discharge Authorization Approved by:
Dave Nagel, Source Control Supervisor Date: 8/4/05

Approval does not relieve the discharger of obligations regarding compliance with any and all applicable Local, State, and Federal pretreatment standards or hazardous waste disposal requirements including any that may become effective after issuance of approval.

Conditions of Authorization:
☒ Discharger is required to comply with the City of San Diego's Policy for Groundwater Discharges to sewer.
☐ Discharger is subject to compliance with special condition(s), see attached.
☒ Flow is limited to a maximum of 10 gallons per minute.

Activity # 211984

DISCHARGE PROHIBITIONS

A. **GENERAL PROHIBITION (from 40 CFR 403): A User may not introduce into a POTW any pollutant(s) which cause Pass Through or Interference.** These general prohibitions and the specific prohibitions in "C" below apply to each User introducing pollutants into a POTW whether or not the User is subject to other National Pretreatment Standards or any National, State, or Local Pretreatment Requirements.

B. **PROHIBITION AGAINST DILUTION:** No Industrial User shall ever increase the use of process water, or in any other way attempt to dilute as a partial or complete substitute for adequate treatment to achieve compliance with a Pretreatment Standard or Requirement.

C. **SPECIFIC PROHIBITIONS: In addition, a User may not introduce the following discharges into the Metropolitan Sewerage System:**

1. **Flammable or Explosive Substances:** Pollutants which create a fire or explosion hazard in the wastewater collection system or treatment plant, including but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Centigrade) using the test methods specified in 40 CFR 261.21;
2. **Corrosives:** Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0 unless a specific variance is granted;
3. **Hazardous Wastes:** Hazardous wastes, as defined in California Administrative Code, Title 22, Section 66261.3;
4. **Trucked Pollutants:** Any trucked or hauled pollutants except at discharge points designated by the POTW;
5. **Toxic and Poisonous Substances:** Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
6. **Substances which may obstruct flow:** Solid or viscous substances in amounts which will cause obstruction to flow in the sewer resulting in Interference;
7. **Odorous Wastes:** Strongly odorous wastes or wastes tending to evolve strong odors;
8. **Uncontaminated Water:** Uncontaminated ground, storm, and surface waters, and roof runoff;
9. **Pretreatment Sludges:** Sludges or deposited solids resulting from an industrial or pretreatment process;
10. **Heat:** Heated wastestreams having a temperature that is equal to or greater than one hundred and fifty (150) degrees Fahrenheit or sixty-five (65) degrees Centigrade;
11. **Radioactive Wastes:** Radioactive wastes or isotopes of such half-life or concentrations as may exceed limits established in the "Code of Federal Regulations" at 10 CFR 20, Subpart K;
12. **Greases and Oils:** Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

APPENDIX C

LIMITED RISK ASSESSMENT

APPENDIX C

LIMITED RISK ASSESSMENT

This Appendix was prepared in support of the Corrective Action Plan (CAP) prepared by CMS in September 2005. Based on direction from DEH, CMS used the site assessment information and stated assumptions to evaluate the current and potential future risk posed by residual gasoline contamination. In lieu of a fully-developed site conceptual model, CMS limited the risk assessment process to evaluation of the benzene contaminant, the upward vapor migration pathway, and commercial/residential exposure scenarios.

This risk evaluation assumes the land use as a commercial facility with an adult worker in the office being the most sensitive receptor. CMS also used site data to extrapolate the risk to offsite residential receptors as described below. The future redevelopment potential cannot be reasonably identified; therefore, the exposure scenario and human-health risk should be reevaluated at that time.

C.1 Vapor Risk Assessment

CMS utilized site-specific information, including the maximum benzene result from direct soil vapor sampling in May 2004, and the DEH's Site Assessment and Mitigation Vapor Risk Assessment Model (revised 8/25/03) to conservatively estimate the toxic health risk posed to humans by residual fuel contamination.

The Vapor Risk Assessment Model as applied to this site is sensitive to the contaminant type, vapor concentration/depth, physical parameters of the soil and slab, and exposure type/duration. For the purpose of this study, the default (most conservative) parameters were selected for unknown conditions and the following site-specific data were used to complete the model.

Site contaminant:	Benzene
Soil gas concentration:	<1.0 ug/L (all locations)
Depth of soil gas:	5 feet
Exposure scenario:	Industrial/Commercial (and Residential)
Air exchange rate:	0.83 exchanges per hour
Attenuation factor:	0.1 (old slab)
Body weight:	70 kilograms
Exposure duration:	25 years (30 years)
Hours per day:	12 (24)
Days per week:	5 (7)
Weeks per year:	50 (52)

A printout of the vapor model with all input and output values is provided in this Appendix. Model results indicate the increased cancer risk from benzene at this site is less than 1.90E-07 (e.g., less than 2 cases in 10 million exposures). A significant risk as defined by the guidelines is when the model predicts that more than 1 in one million

humans will experience an increased risk of cancer due to residual benzene. Therefore, the model indicates the potential for increased risk to commercial-use building occupants.

Another iteration of the model was used to evaluate the potential for onsite contamination to increase the cancer risk to offsite adult residential receptors. In fact, the predicted increase in carcinogenic risk of 6.66E-07 is not significant because this too is less than 1:1,000,000.

In either case, none of the soil vapor samples exhibited detectable concentrations of benzene (e.g., less than 1 microgram per liter), so there does not appear to be a complete pathway for human inhalation exposure.

C.2 Other Factors Necessary to Protect Public Health and the Environment

CMS and Mrs. Abbott provide the following responses to the general risk assessment questions posed in the SAM Manual – Section 6:

Q: *Does the residual soil and groundwater contamination pose a threat to current and/or probable future beneficial uses of water resources?*

A: The site is located in a commercial district where there are limited current or potential beneficial groundwater uses. The residual levels of soil and groundwater contamination do not threaten the groundwater resource because the leak has been stopped and the impacted groundwater is not likely to extend off the property. At the respective distances of 2100 feet and 1-1/4 mile, beneficial use of the nearest surface waters, Paradise Creek and San Diego Bay, are not threatened by residual site contamination.

Q: *Does the contamination pose an immediate or long-term threat to public safety, human health, or the environment, based on current or future use?*

A: Residual TPH contamination is known to exist in soil deeper than 10 feet within a localized area near the former Tank #1. This area and deeper soils do not contribute to significant off-site migration and are not likely to be encountered with present land use, therefore, the contamination does not currently pose a threat to public safety due to physical separation. According to the soil vapor survey, fugitive gasoline vapors are not present, and the limited vapor risk assessment did not identify a significant human health threat from benzene vapors. Any future redevelopment project is likely to change the general assumptions of this risk evaluation; therefore, the immediate and long-term impacts should be reevaluated at that time.

Q: *What levels of contamination remaining in the soil and/or groundwater would be acceptable without impacting public safety, human health, or the environment?*

A: The investigations to date provide ranges and the likely maximum concentrations for TPH, BTEX, and MTBE/Oxygenate constituents of the leaked gasoline. Because the USTs were removed and the pits covered over with asphalt paving, direct contact with

contaminated soil and water is not likely. Benzene was not detected in soil vapor at 5 feet below ground surface and it does not appear detrimental to human health, CMS proposes the following site-specific cleanup levels at this time.

Proposed Cleanup Levels

Lab Constituent	Lab Method	Soil Level	Water Level	Comments
TPH (gasoline range HCs)	EPA 8015M	36,000 mg/kg	5.0 mg/L	No free product
TPH (diesel fuel and extended range HCs)	EPA 8015M	10 mg/kg	1.0 mg/L	No free product
Benzene	EPA 8021 or 8260B	43 mg/kg	1.0 mg/L	<1:1 million increased cancer risk
Toluene	" "	1,400 mg/kg	1.0 mg/L	
Ethylbenzene	" "	550 mg/kg	1.0 mg/L	
Total Xylenes	" "	5,300 mg/kg	1.0 mg/L	
MTBE	EPA 8260B	31 mg/kg	0.5 mg/L	
TBA	EPA 8260B	0.32 mg/kg	0.5 mg/L	

Q: *Is remedial action technically and economically feasible, or can engineering and institutional controls be used to effectively mitigate the risks to human health and the environment from residual contamination?*

A: Because there is no apparent vapor risk and sample concentrations from beneath the suspected UST sources are lower than the proposed cleanup levels, remedial action is not technically needed to facilitate current use of the subject site and adjacent lots. In fact, there are potential hazards associated with any form of active remediation. General engineering and institutional controls should be incorporated into future construction projects and include site-specific plans for excavating and managing contaminated soil and groundwater.

Case Name:
Smog Centro - Commercial

CHEMICAL OF CONCERN:

Enter Chemical Name = benzene

C11 benzene	**E11** dichloromethane (methylene chloride)
C12 benzo(a)pyrene	**E12** ethylbenzene
C13 carbon tetrachloride	**E13** naphthalene
C14 chlorobenzene	**E14** methyl tertiary butyl ether (MTBE)
C15 chloroethane (ethyl chloride)	**E15** tetrachloroethene (PCE)
C16 chloromethane (methyl chloride)	**E16** toluene
C17 1,2-dichlorobenzene	**E17** 1,1,1-trichloroethane
C18 1,3-dichlorobenzene	**E18** 1,1,2-trichloroethane
C19 1,4-dichlorobenzene	**E19** trichloroethene (TCE)
C20 1,1-dichloroethene (1,1-DCE)	**E20** trichloromethane (chloroform)
C21 trans-1,2-dichloroethene	**E21** vinyl chloride
C22 1,1-dichloroethane (1,1-DCA)	**E22** xylene
C23 1,2-dichloroethane (1,2-DCA)	

Chemical Mixture (if app.) =

C27 Gasoline	**E27** Fuel Oil
C28 Kerosene	**E28** Waste Oil
C29 Diesel	

If compound is not listed then data must be entered into the site-specific field.

SITE SPECIFIC INFORMATION			Site-Specific	Value Used
Mole fraction	dimensionless	MF		0.0000
Temperature	K	T		293
Water concentration (chemical)	ug/l	C_w		0
Soil concentration (chemical)	mg/kg	C_t		0
Soil concentration (TPH/TRPH)	mg/kg	C_t		0
Soil gas concentration (measured	mg/m3 (ug/l)	C_{sg}(m)	1	1
Depth of contamination or Soil G	m	X	1.5	1.5

CHEMICAL PROPERTIES			Site Specific	Value Used
Henry's Law Constant	dimensionless	H		0.23
Vapor pressure	atm	VP		0.13
Molecular weight (chemical)	mg/mole	MW		78,110
Molecular weight (mixture)	mg/mole	MW(m)		#N/A
Universal gas constant	atm-m3/mole-K	R	XXXXXXXXX	8.20E-05
Diffusion coefficient in air	cm2/sec	D_a		0.088
Organic carbon partitioning coef.	cm3/gm	K_{oc}		62
SOIL PROPERTIES				
Total porosity	dimensionless	θ		0.3
Air-filled porosity	dimensionless	θ_a		0.2
Water-filled porosity	dimensionless	θ_w	XXXXXXXXX	0.1
Bulk density (dry)	gm/cc	r_b		1.8
Weight fraction of organic carbon	dimensionless	foc		0.01
BUILDING SPECIFICATIONS				
Floor area of building	m2	A		1
% of floor area that flux occurs	dimensionless			100%
Interior Height of building	m	R_h		2.44
Exchange rate of air	exchanges/hr	E		0.83
Slab Attenuation factor	dimensionless	S_b		0.1
OUTDOOR AIR COMPONENT				
Downwind contamination length	m	L		0
Wind speed	m/hr	u		16000
Height of building openings	m	h		2
EXPOSURE SCENARIO Default values are for Industrial Uses				
Body weight	kg	BW		70
Inhalation rate	m3/day	IR		20
Exposure duration	yrs	ED		25
Hours per day	hr/day			12
Days per week	days/week			5
Weeks per year	weeks/yr			50
HEALTH RISK FACTORS				
Reference dose	mg/kg-day	RfD		0.0017
Slope factor (potency)	1/(mg/kg-day)	SF		0.1

Risk Calculations

Case Name: Smog Centro - Commercial

Chemical: benzene

Variable Descriptions				Units
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	7.81E+04	mg/mole
Vapor pressure	VP	=	1.30E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	0.00E+00	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	0.00E+00	mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.80E+00	gm/cc
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Water-filled porosity	θ_w	=	1.00E-01	dimensionless
Soil/water distribution coef.	K_d	=	6.20E-01	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=	**1.00E+00**	**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> **1.00E+00 mg/m3**

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	3.00E-01	dimensionless
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**4.60E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.50E+00	m
Calculated Flux	**F_x**	=	**1.10E-03**	**mg/m2-hour**

Case Name: Smog Centro - Commercial

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	1.00E+00	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Slab Attenuation factor	S_b	=	1.00E-01	dimensionless
Flux area within building	Af	=	**1.00E-01**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.44E+00**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**2.03E+00**	m3/hr
Indoor air component	C_i	=	**5.45E-05**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	1.60E+04	m/hr
Height of building openings (or height of breathing zone)	h	=	2.00E+00	m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**5.45E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		1.20E+01	hr/day
Exposure time	ET	=	**5.00E-01**	hr/24 hours
Days per week	conversion		5.00E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**2.50E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	IT_c	=	**1.90E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**5.33E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	5.33E-06	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**3.14E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.90E-06	mg/kg-day
Slope factor (potency)	SF	=	1.00E-01	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.90E-07**	

Case Name:
Smog Centro - Residential

CHEMICAL OF CONCERN:

Enter Chemical Name = benzene

C11	benzene	**E11**	dichloromethane (methylene chloride)
C12	benzo(a)pyrene	**E12**	ethylbenzene
C13	carbon tetrachloride	**E13**	naphthalene
C14	chlorobenzene	**E14**	methyl tertiary butyl ether (MTBE)
C15	chloroethane (ethyl chloride)	**E15**	tetrachloroethene (PCE)
C16	chloromethane (methyl chloride)	**E16**	toluene
C17	1,2-dichlorobenzene	**E17**	1,1,1-trichloroethane
C18	1,3-dichlorobenzene	**E18**	1,1,2-trichloroethane
C19	1,4-dichlorobenzene	**E19**	trichloroethene (TCE)
C20	1,1-dichloroethene (1,1-DCE)	**E20**	trichloromethane (chloroform)
C21	trans-1,2-dichloroethene	**E21**	vinyl chloride
C22	1,1-dichloroethane (1,1-DCA)	**E22**	xylene
C23	1,2-dichloroethane (1,2-DCA)		

Chemical Mixture (if app.) =

C27	Gasoline	**E27**	Fuel Oil
C28	Kerosene	**E28**	Waste Oil
C29	Diesel		

If compound is not listed then data must be entered into the site-specific field.

SITE SPECIFIC INFORMATION			Site-Specific	Value Used
Mole fraction	dimensionless	MF		0.0000
Temperature	K	T		293
Water concentration (chemical)	ug/l	C_w		0
Soil concentration (chemical)	mg/kg	C_t		0
Soil concentration (TPH/TRPH)	mg/kg	C_t		0
Soil gas concentration (measured	mg/m3 (ug/l)	$C_{sg}(m)$	1	1
Depth of contamination or Soil G	m	X	1.5	1.5

CHEMICAL PROPERTIES			Site Specific	Value Used
Henry's Law Constant	dimensionless	H		0.23
Vapor pressure	atm	VP		0.13
Molecular weight (chemical)	mg/mole	MW		78,110
Molecular weight (mixture)	mg/mole	MW(m)		#N/A
Universal gas constant	atm-m3/mole-K	R	XXXXXXXXX	8.20E-05
Diffusion coefficient in air	cm2/sec	D_a		0.088
Organic carbon partitioning coef.	cm3/gm	K_{oc}		62
SOIL PROPERTIES				
Total porosity	dimensionless	θ		0.3
Air-filled porosity	dimensionless	θ_a		0.2
Water-filled porosity	dimensionless	θ_w	XXXXXXXXX	0.1
Bulk density (dry)	gm/cc	r_b		1.8
Weight fraction of organic carbon	dimensionless	foc		0.01
BUILDING SPECIFICATIONS				
Floor area of building	m2	A		1
% of floor area that flux occurs	dimensionless			100%
Interior Height of building	m	R_h		2.44
Exchange rate of air	exchanges/hr	E		0.83
Slab Attenuation factor	dimensionless	S_b		0.1
OUTDOOR AIR COMPONENT				
Downwind contamination length	m	L		0
Wind speed	m/hr	u		16000
Height of building openings	m	h		2
EXPOSURE SCENARIO Default values are for Industrial Uses				
Body weight	kg	BW		70
Inhalation rate	m3/day	IR		20
Exposure duration	yrs	ED	30	30
Hours per day	hr/day		24	24
Days per week	days/week		7	7
Weeks per year	weeks/yr		52	52
HEALTH RISK FACTORS				
Reference dose	mg/kg-day	RfD		0.0017
Slope factor (potency)	1/(mg/kg-day)	SF		0.1

Case Name: Smog Centro - Residential

Chemical: benzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	7.81E+04	mg/mole
Vapor pressure	VP	=	1.30E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	0.00E+00	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	0.00E+00	mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.80E+00	gm/cc
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Water-filled porosity	θ_w	=	1.00E-01	dimensionless
Soil/water distribution coef.	K_d	=	6.20E-01	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=	**1.00E+00**	**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> **1.00E+00 mg/m3**

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	3.00E-01	dimensionless
Air-filled porosity	θ_a	=	2.00E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**4.60E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.50E+00	m
Calculated Flux	**F_x**	=	**1.10E-03**	**mg/m2-hour**

Case Name: Smog Centro - Residential

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	1.00E+00	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Slab Attenuation factor	S_b	=	1.00E-01	dimensionless
Flux area within building	Af	=	**1.00E-01**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.44E+00**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**2.03E+00**	m3/hr
Indoor air component	C_i	=	**5.45E-05**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	1.60E+04	m/hr
Height of building openings (or height of breathing zone)	h	=	2.00E+00	m
Outdoor air component	C_o	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	C_t	=	**5.45E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	3.00E+01	yrs
Hours per day	conversion		2.40E+01	hr/day
Exposure time	ET	=	**1.00E+00**	hr/24 hours
Days per week	conversion		7.00E+00	days/week
Weeks per year	conversion		5.20E+01	weeks/yr
Exposure frequency	EF	=	**3.64E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**1.10E+04**	days
Chemical Intake (carc. risk)	IT_c	=	**6.66E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	IT_{nc}	=	**1.55E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	1.55E-05	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	HI	=	**9.13E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	6.66E-06	mg/kg-day
Slope factor (potency)	SF	=	1.00E-01	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**6.66E-07**	